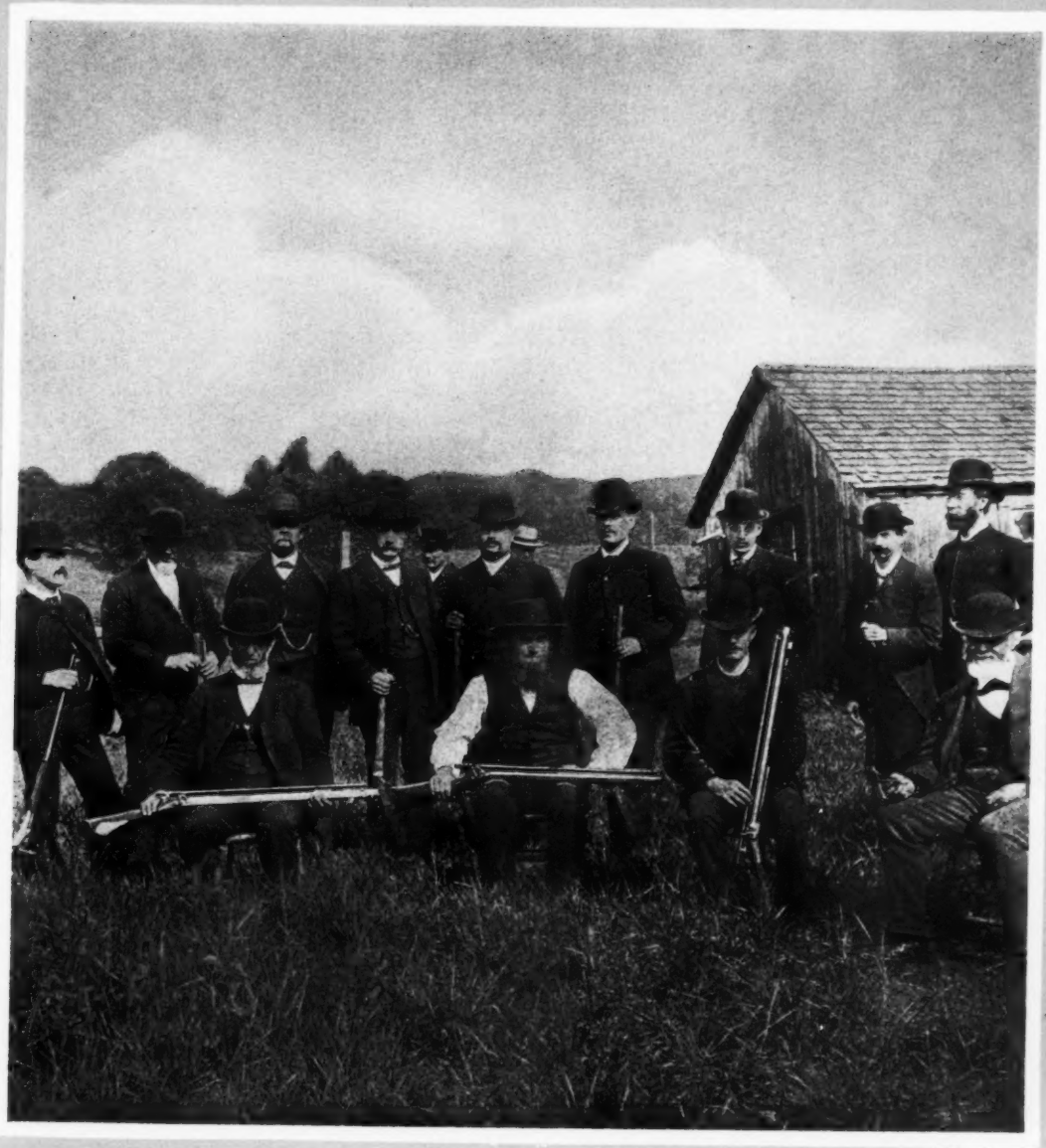
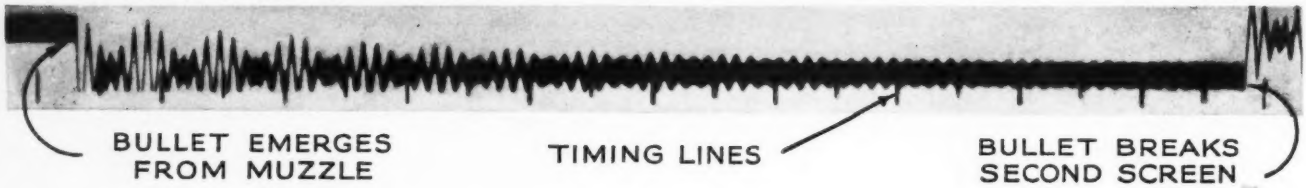
THE AMERICAN RIFLEMAN



ANNIVERSARY NUMBER

1871— MAY, 1931 —1931

"Backward, Turn Backward, O Time, in Your Flight"



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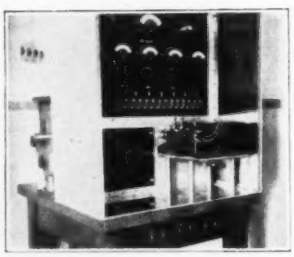
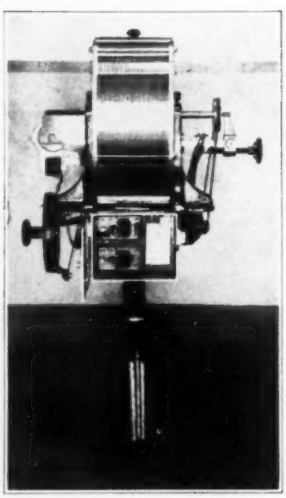


Control panel of oscillograph switch board.



Special high-speed oscillograph camera used in precise velocity determinations, primer ignition and similar work.

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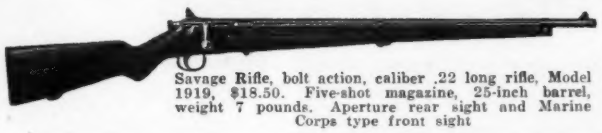

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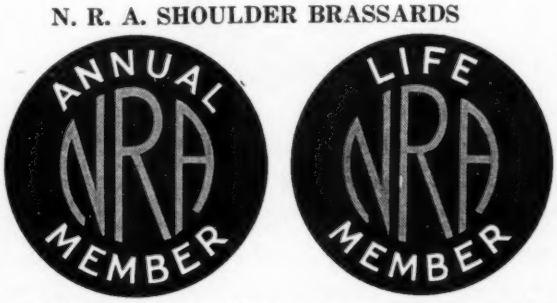

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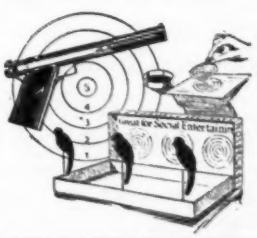
JUNIOR TARGETS, SINGLE BULL, 500.....	**1.00**
JUNIOR TARGETS, FIVE BULL, 500.....	**1.25**



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New World's Records made with Palma Hi-Speed .22's

Miss Edith G. Pritchard and, below, composite of her targets.

UNIVERSITY OF VERMONT WOMEN'S RIFLE TEAM

From Left to Right—Front Row: Misses Georgina Hubert (Capt.), Evelyn I. Slayton (Mgr.), Alice C. Dodge, Staff Sergeant Raymond T. Conner (Coach), Misses Nellie M. Chase, Edith G. Pritchard, Elizabeth Clark, Emily Murray. *Second Row:* Misses Helen Esielionis, Cora I. Humphrey, Daisy M. Putnam, Gertrude A. Marsh, Frances E. Thomas, Lenla Walker. *Back Row:* Dorothy M. Taylor, Ruth Goss, Clara A. Hersom, Marion V. Urie, Marguerite R. Dunsmore, Ethel C. Bishop, Esther C. Smith.

World's Rifle Record Is Set By Vermont Women's Team

Special to The New York Times.

BURLINGTON, Vt., Feb. 14.—The University of Vermont women's rifle team established a new world's record for the small new style targets by making a perfect score of 500 in matches here this week with Massachusetts Agricultural College, the University of Hawaii and the University of Arkansas, Coach R. T. Conner announced today.

The team includes the Misses Georgina Hubert, Edith C. Pritchard, Ethel C. Bishop, Frances E. Thomas and Evelyn I. Slayton.

Composite (actual size) of Miss Pritchard's 30 targets (2 shots in each).

TWO new world's records have just been added to the long list made by a combination of fine shooting and Kleanbore cartridges.

In winning the Women's Individual Intercollegiate Match conducted by the N. R. A., Miss Edith G. Pritchard established a remarkable world's record. Her score was 595x100, consisting of 60 shots prone at 50 feet. Miss Pritchard has made a possible 100 in each of 28 consecutive Intercollegiate Matches this season—2800x2800. Remington Palma Hi-Speed Cartridges were used by this remarkable young shooter.

The Women's Rifle Team of the University of Vermont chalked up another world's record during the week of February 14 with a perfect score of 500 x 500. The team has been defeated but once in three years and it took a perfect score to do it. All members of the team used Kleanbore.

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No. 48 Lyman micrometer rear sight for .30 Govt. or M1 .22 caliber, also Win., Rem., Sav., B.S.A., Mauser, Krag, etc., $11.50 with disc.

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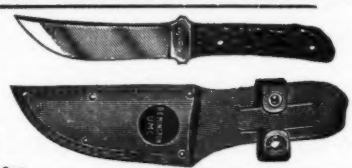

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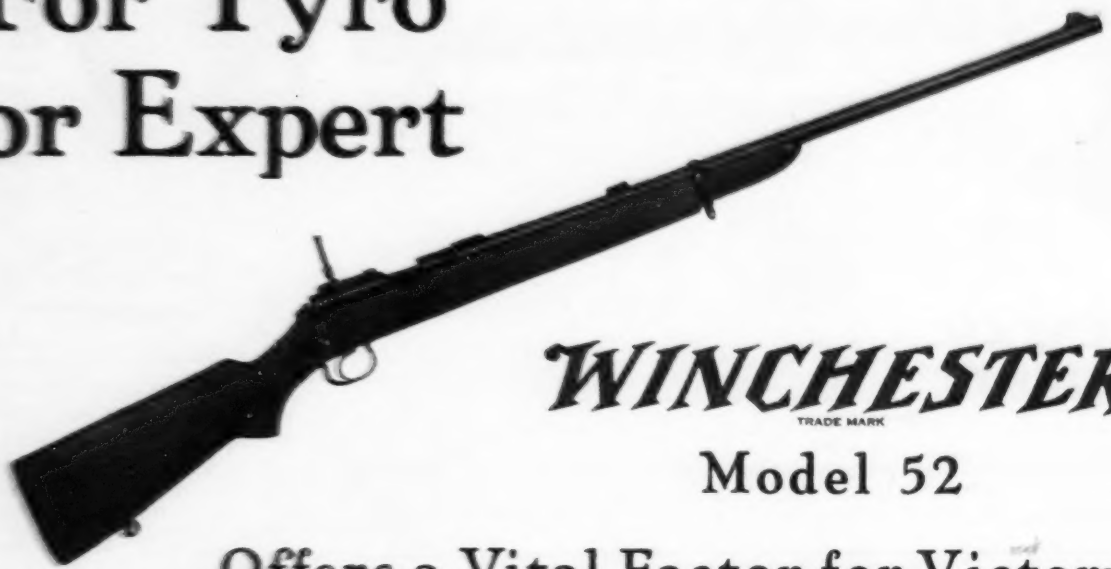

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NEW HAVEN, CONN., U. S. A.

The AMERICAN RIFLEMAN

VOL. LXXIX, No. 5 MAY, 1931

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Cover Photo—From the collection of Walter M. Cline

This picture was taken at the time A. C. Gould and his following of breech-loader advocates, of the Walnut Hill Gun Club, shot it out with the muzzle-loader clan of the National Rifle Club, of Vernon, Vt. Mr. Gould was editor of "Shooting and Fishing," predecessor of THE AMERICAN RIFLEMAN, and had expected to give the match a big write-up, as the story runs; but the muzzle-loaders beat his crowd so badly that in the forthcoming issue of the magazine only a few lines were devoted to the match, stating that "All made good scores." Mr. Gould, with full beard, is seen standing at the extreme right of the picture, while the bearded veteran seated in the middle of the picture is Brockway, a master of fine muzzle-loading rifles.

The Muzzle-Loading Rifle 7
By WALTER M. CLINE

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L. J. SEXTON, *Editor*

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EDITORIAL

"Backward, Turn Backward, O Time, In Your Flight"

IN THIS year of 1931 the National Rifle Association celebrates its sixtieth birthday. First organized back in 1871, the N. R. A. has weathered the storms and continued to grow, until today it is a power in the shooting world, and an established national institution of which this country may well be proud.

In honor of the occasion of the sixtieth birthday of the N. R. A., we are bringing out this special Anniversary number of THE AMERICAN RIFLEMAN. In this issue we turn the clock back sixty years, and look at rifles, pistols and shotguns as they existed in this country at the time the N. R. A. was born.

In the time of which we write, much of this country was still unsettled, and game of all kinds inhabited the forests, swamps, and marshes, or roamed the prairies, in countless thousands. Firearms had reached a stage in their development in which they were really satisfactory, and every able-bodied man or boy along the frontiers and in the rural districts turned to hunting as a matter of course. A rifle was a part of the furnishing of every home, and the principal pastime was the shooting match.

Times have greatly changed. Here in the N. R. A. we still hold to the old ideal of a nation of riflemen, but we are seeking the realization of that ideal in a different way. Hunting as it existed in the early years has vanished forever. The frontiers are gone, and a large percentage of our population now lives in cities. To offset this, rifle clubs are springing up all over the country, and Perry and large regional matches bring together the best shots from the four corners of the land. Competition and excitement run high, and new records are made only to be broken. Our guns and ammunition are the finest that the world has ever known, and interest and enthusiasm are spreading rapidly. The picture is a bright one, and we may indeed become once more a nation of riflemen.

But let us pause in our seeking after the things of our own day, and, looking back over the years to the period of the early seventies, see just what manner of guns were in use in that day, which was, indeed, the Golden Age of hunting in America.

The AMERICAN RIFLEMAN

MAY, 1931

The Muzzle-Loading Rifle

By WALTER M. CLINE

(Photographs by the author)

NOTE.—In this, his contribution to our Anniversary Number, Mr. Cline has chosen for his subject the muzzle-loading rifle, because, while back in 1871, when the N. R. A. was born, the breech-loading rifle was rapidly receiving widespread recognition, the muzzle-loading rifle, at the peak of its development and superbly accurate, was the weapon used by most of the well-known target-shots of that time.

It is interesting to remember that in certain parts of the country the muzzle-loading rifle is still being used for hunting; and in the Tennessee mountains, near Mr. Cline's home, they still hold the old-time shooting matches in which the long-barreled muzzle-loading rifle is used. Mr. Cline is personally acquainted with at least four gunsmiths in the Tennessee mountains who are capable of making these rifles, as shown in some of the pictures accompanying this article.—EDITOR.

THERE is a growing interest in the rifle of by-gone days, so interwoven has it been in the lives of our people and the destiny of our country. We glory in the deeds of our border riflemen of '76, of the Kentucky and Tennessee backwoodsmen under Andrew Jackson at New Orleans, and of Crocket and his companions at the Alamo. Tradition and early records by reliable authorities have handed down to us accounts of some of the remarkable shots made in the days of the muzzle-loading flintlock rifle. They seem like fairy tales to those who know little of the accuracy of these early rifles, but the long rifle of the pioneer was an instrument of precision and served its purpose well.

What we know of the first rifled arms has come down to us from a dim past. Captain Beaufoy, one of the best early writers on the rifle, says that the knowledge of the grooved barrel and the effect of spiral motion was known in Russia and the more northern parts of Europe long before its use by the more advanced nations of Central and Southern Europe. It is quite probable that the theory of spiral motion was known at a very early date. Arrow points beveled so as to produce a rotary motion have been found in considerable numbers, showing that the aborigines were familiar with this principle.

With the discovery and use of gunpowder as a propellant for the missile or ball from the first firearms, began the search for accuracy. Just when the lead ball was first used is not known, but no doubt it came into use with the handgun. Yet it was several hundred years before the effect of gunpowder on the lead ball was discovered. All efforts of the early makers and users of the first rifled arms were to force the ball into the grooves before the arm was fired. Bullets of groove diameter were used and were forced down the barrel with an iron ramrod and mallet.

The greased wad and patch were used very early and are mentioned by a Spanish writer, Alonso Martinez de Espinar, in 1644, who says: "It is necessary to have felt wad cut with a punch, which must be exactly fitted to the mouth of the barrel. This must be pitched with Greek pitch, wax, and tallow. All this should be dissolved and the wads thrown into it, and after they have absorbed the pitch they must be allowed to cool and then they remain very hard and greasy; these are very important for rifled Arquebuses, because with them the balls go in more easily, for they have to fit very closely in the barrel, having to be driven to the bottom by blows of the ramrod." Robbins, in his tracts on gunnery, makes mention of the Swiss using the greased patch; but the ball still remained a very tight fit in the bore and had to be forced into the grooves in loading—the very thing that is not productive of accuracy with a round ball. This difficulty of loading caused the barrel of the rifle of Central Europe to be short.

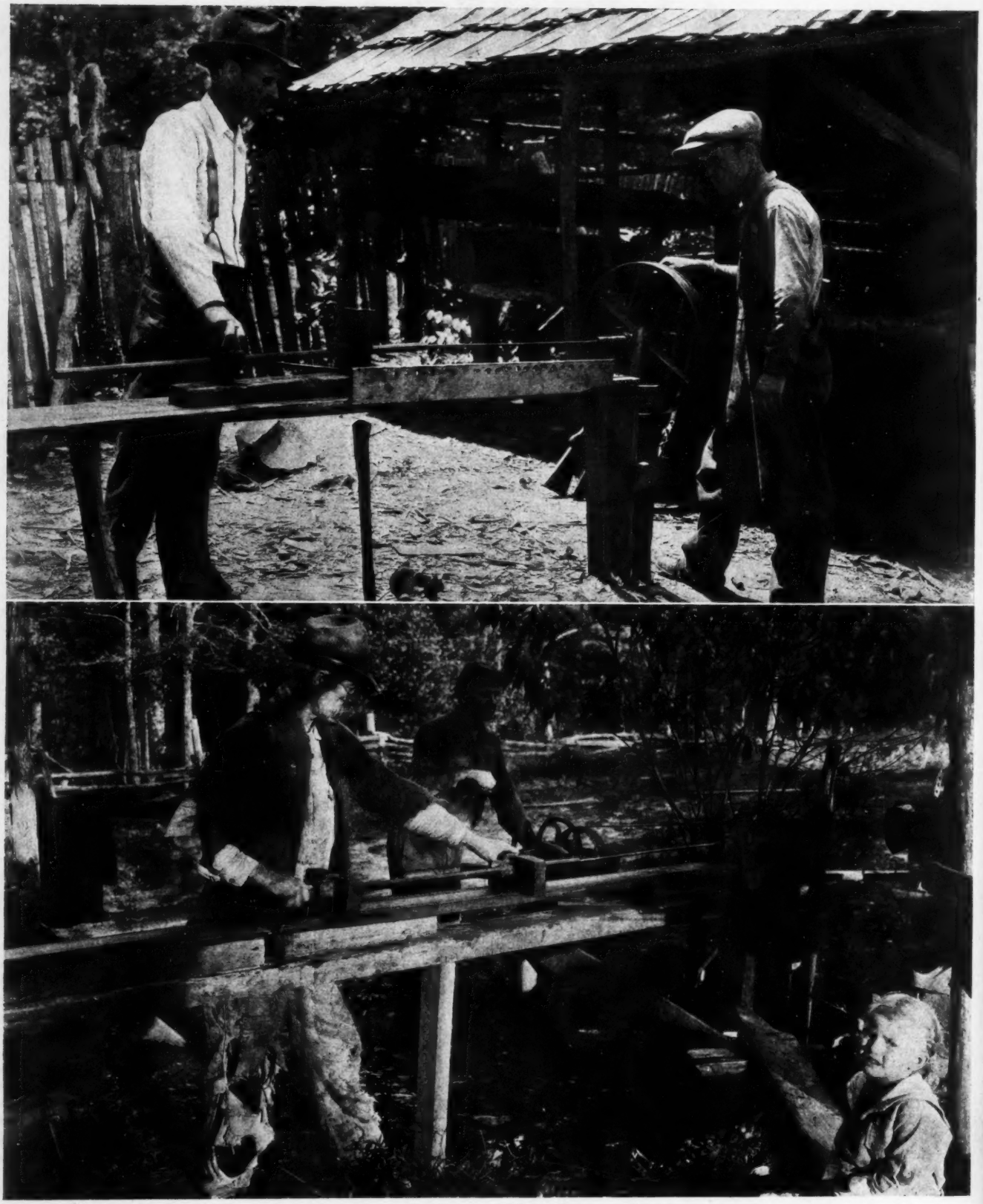
Daddy Crest and his rifle, "Old Scaley"

The discovery that a ball of bore diameter used with greased patch could be loaded without difficulty and better accuracy secured, must have been made before there was any change in the design of the rifle. To have attempted to use the same method of loading the long-barrel flintlock rifle as that used in loading the rifle of Central Europe would have rendered the former useless.

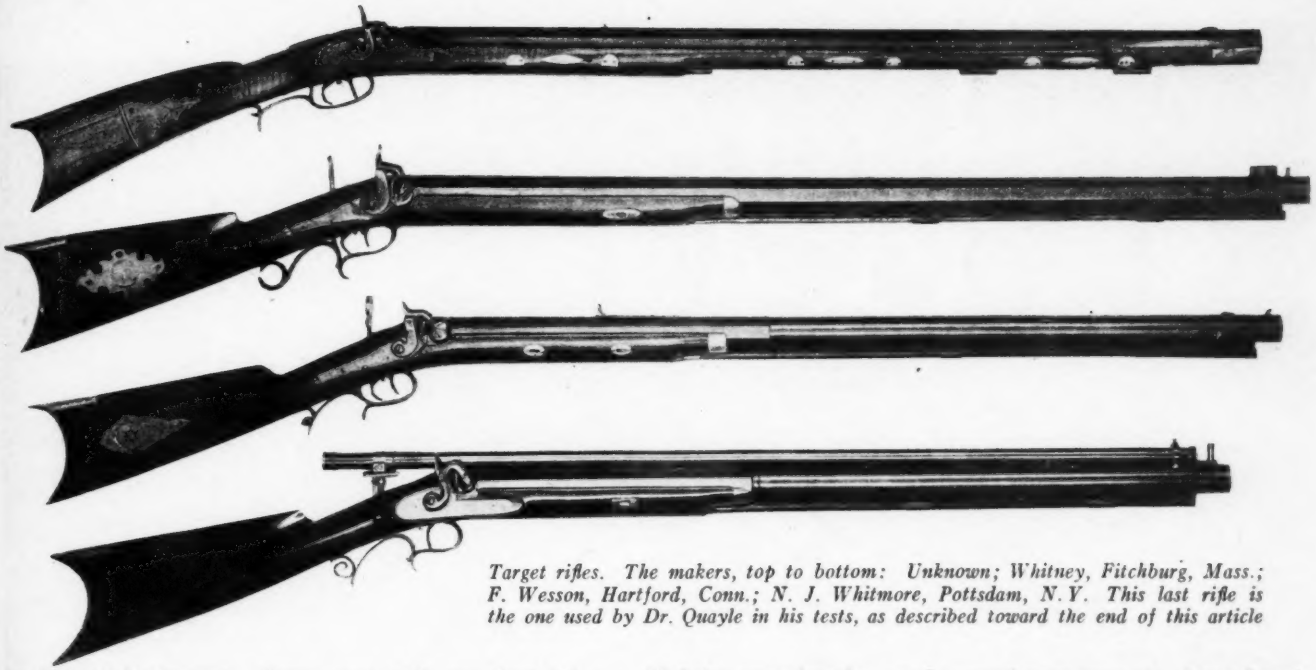
The use of the greased patch, together with a ball of bore diameter, allowed the gunsmith to experiment with different lengths of barrels. As the musket and fowling piece of this period had long barrels, it followed that the rifle should have a long barrel. It was not the conditions in this country—America—that caused this radical change in the rifle, but that age-old quest for accuracy. With the development of the long-barreled flintlock rifle by the pioneer gunsmiths of Pennsylvania, and its appearance at about the beginning of the great influx of Germans and Scotch-Irish into America, there was available an accurate shooting rifle that made possible the advance of these home-seeking people beyond the then established frontiers.

The manufacture of the rifle spread rapidly as the pioneer conquered the wilderness and the savage. From Pennsylvania, its birthplace, down the valley of Virginia into the Carolinas, and on westward across the mountains into Tennessee, this rifle followed the rapidly-advancing frontier. Tried and tested in hundreds of desperate conflicts in the hands of the American pioneer, its use became almost universal. It was not devised by any board of ordnance, but was the product of a race of practical men developed over a period of many years and with the improvements which were contributed by each generation of skilled workmen; and it became a weapon of wonderful precision at distances within its range.

During the decade preceding the Civil War, and the period of transition of the muzzle-loading to the breech-loading rifle, the muzzle-loading rifle attained



Mountain Riflesmiths boring barrels



Target rifles. The makers, top to bottom: Unknown; Whitney, Fitchburg, Mass.; F. Wesson, Hartford, Conn.; N. J. Whitmore, Pottsdam, N.Y. This last rifle is the one used by Dr. Quayle in his tests, as described toward the end of this article

its highest development. Every town and city had one or more gunsmiths, and rifle-making spread the length and breadth of the land. The shooting match became the greatest of all American sports. Here the excellence of each riflemaker was put to a test, by which his reputation was made. In many places where these matches were held every Saturday, for years, the writer has seen the stumps of large trees which had been shot down by having had the targets placed against them.

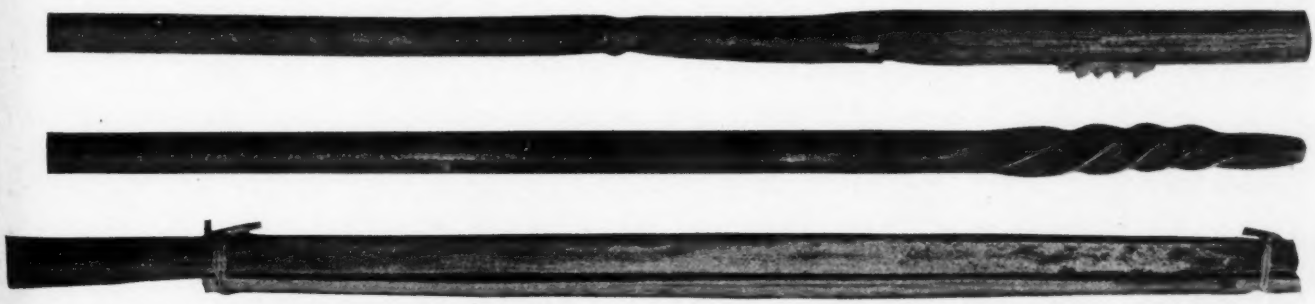
There were three types of the muzzle-loading rifle which were in use during the late percussion period: the hunting rifle with its different lengths of barrel, an all-purpose rifle, in general use; the long, heavy, soft-metal-barreled match rifle; and that weapon of precision, the American target rifle, with false muzzle, swages, bullet-starter, and other accessories.

In the manufacture of the hunting-rifle the accepted weight was that which a man could conveniently carry—running, usually, from 7 to 12 pounds, with an occasional one weighing as much as 14 pounds. The proportion of the weight of the gun to that of the ball was about 500 to 1, this being approximately the heaviest ball this rifle would throw without excessive recoil. The names of many of the early gunsmiths who became noted for the excellence of their arms, together with specimens of their work, have been preserved, but among the present generation there are many skeptics who doubt the accuracy of the muzzle-loading rifle. There are few persons living today who have had the opportunity of handling in actual use, either in hunting or target work, a perfect specimen of the long rifle made by a master workman, and who also possess the skill in loading these arms that is acquired only by long practice.

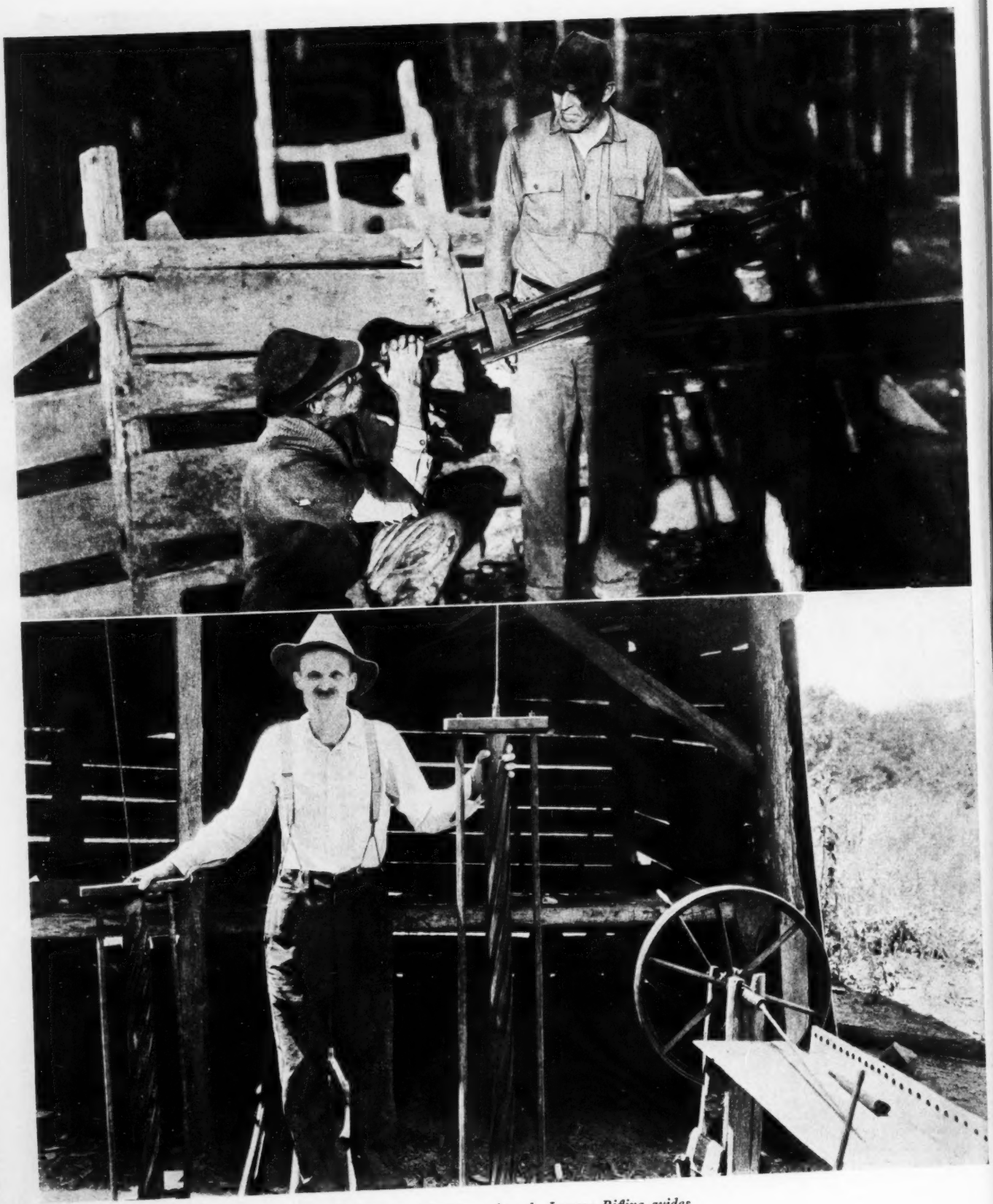
Fennimore Cooper's hero, Hawkeye, in "The Last of the Mohicans," advising Uncas in regard to loading his rifle, tells him that he is "wasteful of his powder," and that "a kicking rifle never carries a true bullet"; that "of all weapons the long, soft-metaled barrel rifle is the most dangerous in skilled hands, though it wants a strong arm, a quick eye, and great judgment in charging to put forth all its beauties." While Cooper's characters are fictitious, and he may have overrated the skill of Hawkeye a bit, these words, penned many years ago, show a knowledge of the rifle that could have been acquired only by use and close association.

Handed down from generation to generation, each new discovery and improvement was thus preserved; and the rules and methods for regulating the amount of powder, the thickness of the patch, the proper size of the ball for the bore, and the pressure required to seat the ball down on the powder, are the same today as they were over a hundred years ago. All gunsmiths used the same methods, with slight variations, in the fabrication of their arms.

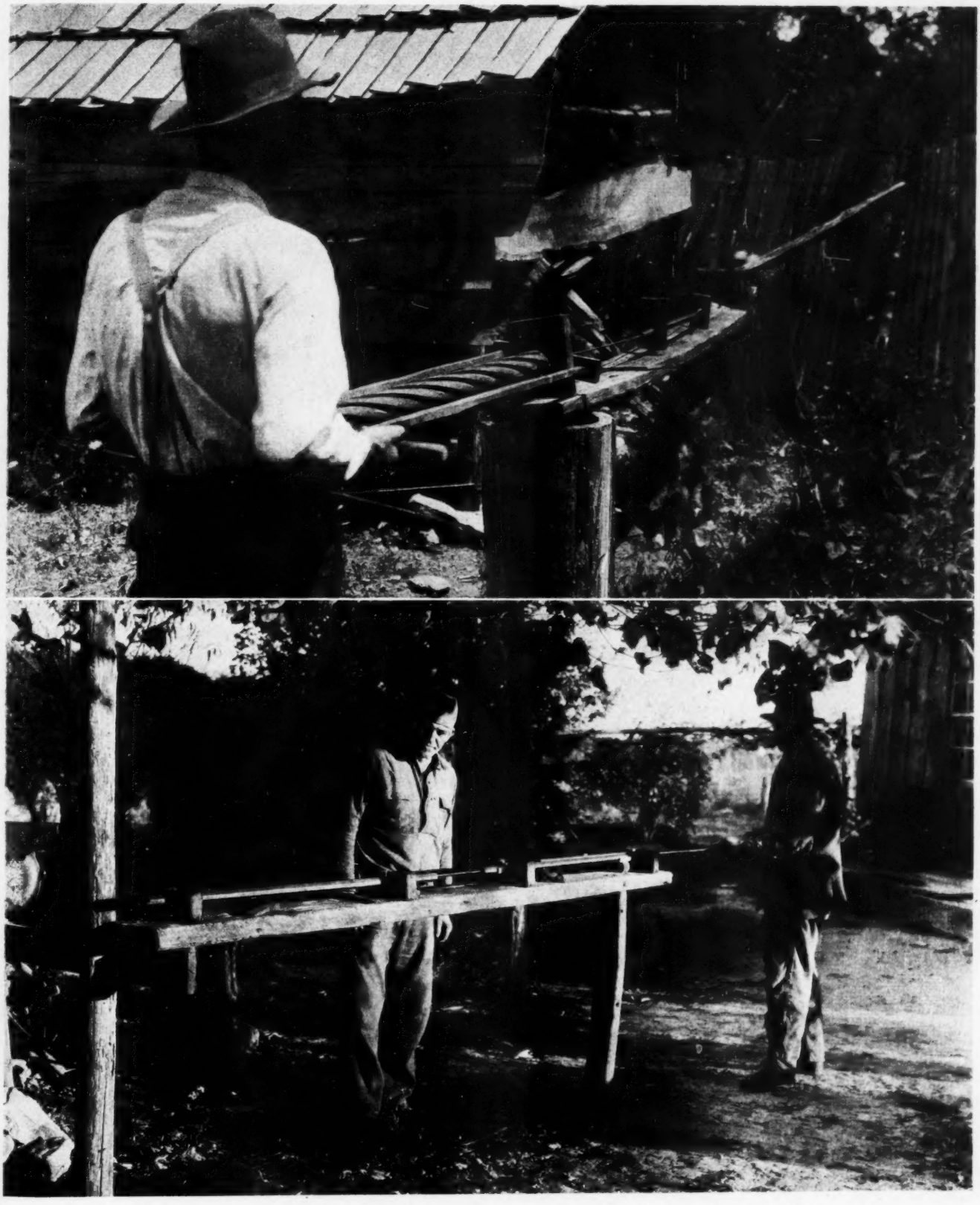
Barrels were welded from a flat bar of iron. Lap-welding was used by most workmen. The edges of the bar were flattened out, then turned and welded over an iron rod. Only an inch or so of length was welded at one time, then the rod was knocked out and another inch welded, and so on, until the entire barrel was welded. Half a day was usually required to weld a barrel 48 inches long. The short bit and the long bit were used in boring the barrel. The short bit was made by welding a short bar of squared steel to the end of a long round iron rod,



Tools used in boring and rifling barrels. Top: Rifling tool, with rifling cutter or "saw" in place in hickory "rifling head." Middle: Short bit for roughing out the bore after welding. Bottom: Long bit for smoothing the bore, with hickory guard on the off side of cutter to prevent borings from scratching the barrel



Upper: Straightening a barrel. Lower: Rifling guides



Rifling the barrels. In the upper picture the regular spirally-cut wooden cylinder is being employed, while the lower illustration shows another rifle barrel being used to rotate the cutter

Moulding bullets and burning boards black for targets

for a shank. The square end was then heated, twisted, and tempered. This did the cutting. This bit would follow the hole in the barrel left by the rod in welding. A short point left straight, not twisted, at the end of the bit prevented the latter from leading off, so that the barrel could be bored from both ends, and the two bored holes meet on line in the middle.

The long bit was next used. This was made by welding to the side of a small squared bar of iron a thin piece of steel. This welding was done by the aid of borax as a flux, to make the steel stick to the soft piece of iron. This bit was now welded to the end of a rod of sufficient length so that all cutting could be done from one end of the barrel. The steel portion was now tempered, and then straightened. The steel, backed by the soft iron, was laid on the anvil and tapped with a hammer. It required considerable skill in tempering to get just the right degree of hardness so that the steel would not crack in straightening. The two edges of the steel which were to be the two cutting edges, were ground sharp; and on the back of the bar, opposite to the steel, was fastened a strip of hickory wood, rounded to conform to the bore. This strip of hickory prevented any iron cuttings from scratching the barrel; and by placing small shims of paper between the wood and the iron, as many cuts could be made as were necessary. All cutting with the long bit was made from the breech to the muzzle, the slight wearing away of the wood as the bit traveled through the barrel in successive cuttings giving a taper, or choke, bore.

The barrel was now straightened. A silk thread was stretched through the bore, and was kept taut by a hickory bow. By looking through the barrel toward the light, the crooked places could be detected by the shadow that the silk thread cast on the polished surface of the bore. This crooked place was marked on the outside of the barrel by moistening the fingers with saliva and then touching the place opposite the shadow. The barrel was then placed on the anvil and tapped with a hammer. This was repeated, if necessary, until no shadow showed in the bore, the work progressing from the middle toward the ends of the barrel. Meredith Wolf, one of the early gunsmiths of Tennessee, told the writer that in his fifty years of experience he had seen only one barrel that did not need straightening.

The barrel was now ready for rifling. The rifling machine consisted of a cylinder of wood, sometimes as much as 4 inches in diameter—the larger the better, as this tended to reduce lost motion when working through a small bore in the barrel. This cylinder of wood had spiral grooves cut in the outer surface, to the number of six, seven, eight, or whatever number of grooves the workman decided to cut in a barrel, or the order called for. There were extra cylinders, each having a certain number and pitch of grooves. One gunsmith had eight extra cylinders, each one different, and all interchangeable in a framework of wood. An "index," fastened in the bench, had fingers fitting into the spiral grooves in the wooden cylinder, and revolved the cylinder when the latter, held in its frame, was pushed back and forth along the top of the bench. This cylinder carried an iron rod at one end, and at the other end of this rod a piece of hickory wood was fastened, which carried the cutting tool, or saw, this piece of hickory being cylindrical in shape, and a close sliding fit in the bore. These saws were made in different shapes, some having teeth inclined in only one direction, others with teeth inclined both ways and cutting with both movements of the rod back and forth through the bore. Still others had straight teeth, that scraped the metal rather than cut it. The finished result was dependent upon the skill of the workman.

After the saw was set in the hickory "rifling head," the latter was passed through

the barrel, the first cut being a very heavy one. The saw was worked back and forth until it would not cut any more. The cylinder was then turned so that its next groove engaged the fingers of the index, and the next groove was cut in the barrel; and so on until all grooves were cut to the same depth. The saw was then raised and a thin shim of paper placed under it, and the above process repeated. So slight was the cut taken at each operation that for each groove the saw was passed through the bore as many as forty times for each time it was raised. With a 7-groove barrel, that would mean 280 strokes for each time the saw was raised. This was repeated from ten to fifteen times for each groove, depending upon the size of the ball to be used, making 2,800 or more times the saw was passed through the barrel to complete the job. A barrel rifled by this process needed no smoothing out with emery, and a few shots would remove the wire edge from the lands. No more perfect job can be done today with the finest machinery than the barrels rifled by the master gunsmiths of the muzzle-loading days.

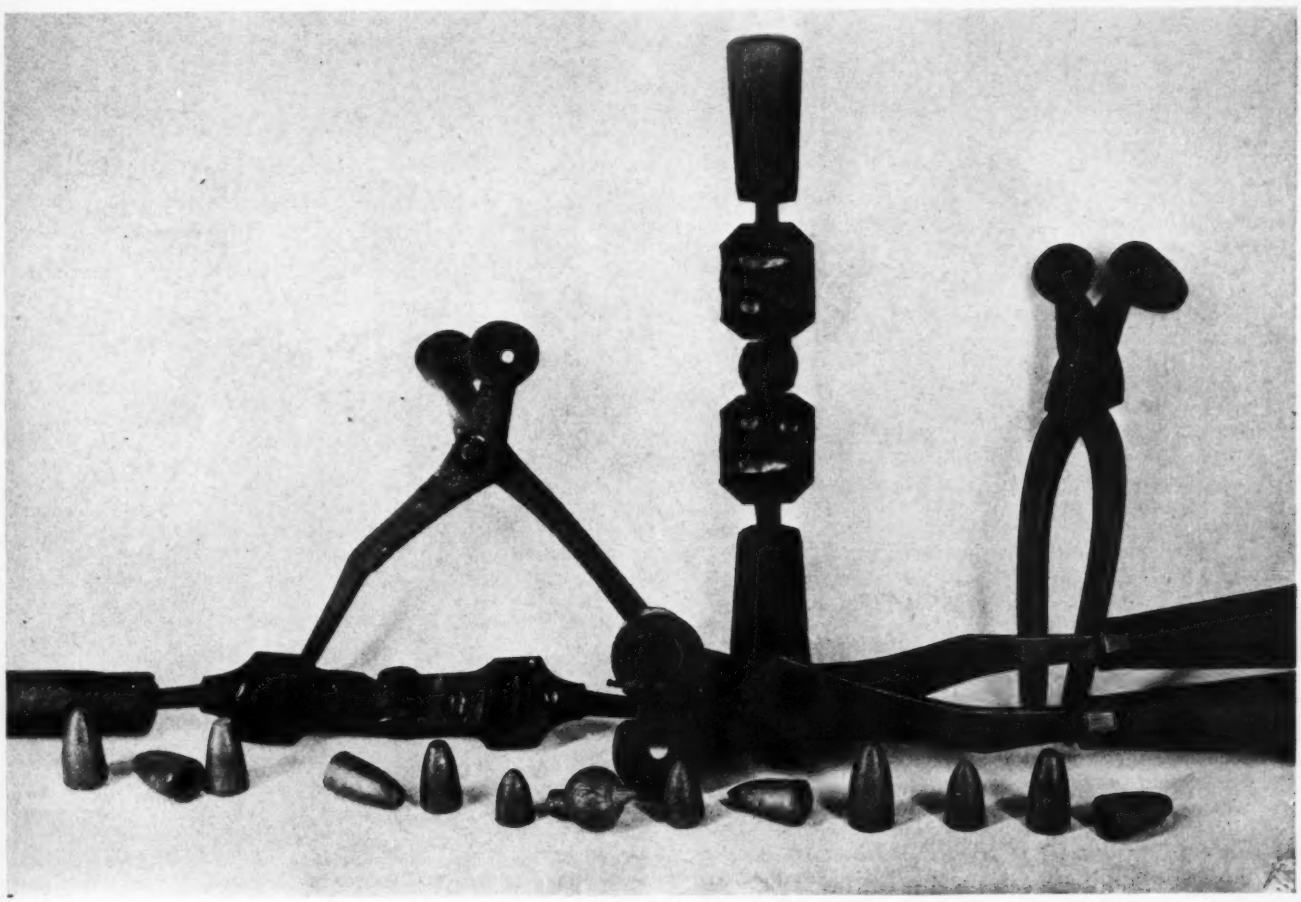
The outside of the barrel was then filed, ground, or left just as it was welded—some customers preferred it that way—after which it was breeched, stocked, sighted, and tested. The gunsmith made his own tools for the work.

That these old rifles were accurate beyond the belief of present-day riflemen is borne out by targets preserved by the writer from the old-time shooting-matches, and by the performance of the rifles in the mountains of Tennessee on black bear, deer, wildcat, and various species of small game. The writer has used these rifles with regular loads, and has also used them double-charged and double-patched. He has killed game as dead at 100 yards as could have been done with a high-power rifle. The long-barrel Kentucky, with its half-ounce soft-lead ball, driven with a full charge of powder, was all that could be desired, and a second shot was seldom required. The longest shot I ever saw was made by William Walker on a black bear, with his rifle that he called "Death." The distance as measured was 290 yards. The bear was crossing a deep hollow on a log, and was hit in the left fore shoulder and so disabled that it was easily overtaken and killed.

Very few shots were thrown away by men who used the muzzle-loading rifle. It was accurate, economical of ammunition, and deadly. Recent measurements of the velocity of the muzzle-loading rifle have shown that with a powder charge of only two-fifths the weight of the bullet, using FFFG granulation of powder, a velocity of over 1,700 feet per second was attained. This test was made by the late Dr. Philip P. Quayle, of the Peters Cartridge Co., with a rifle made by B. W. Amsden, of Saratoga Springs, N. Y. This rifle has a 28-inch barrel and is in perfect condition. By double-charging and double-patching, as was often done in hunting big game, the velocity went over 2,000 feet per second.

A remark was made by one of my mountaineer friends recently, as a party of us sat around the camp fire one night while on a hunting trip in the Cumberland Mountains, when the conversation turned to the old days, when we all used muzzle-loading rifles. This man, a true mountaineer, said that he "wished there had never been any other gun made except the muzzle-loading rifle, because in that case we would always have had plenty of game."

The match rifles differed from the hunting rifles in length of barrel, weight, and caliber, very few being less than .40 caliber. The barrel lengths ran from 48 inches to 60 inches, with some few even longer. The barrels were made of the softest iron, and were always welded. Very few of the best makers of match rifles would put their names on the barrels unless they had welded them themselves. After the barrel was welded, it was annealed and made as soft as possible. One very successful maker used a process that had been handed down in the family for four generations. He would place the



Moulds and bullets for American target rifles

An old-time shooting-match, with muzzle and elbow rest

barrel on a level piece of ground prepared especially for it, then pile a long heap of dry chestnut wood over it, and then set fire to the wood, and leave it until all the wood had been consumed and the barrel had slowly cooled. I have in my possession two rifles that were annealed by this process, and one may shave them with a pocket knife and not dull the blade—in fact, the sides of the octagons were shaved true with a drawknife made by the smith himself. These barrels would not shoot slick like a steel barrel, and were much in demand. There is no doubt that these heavy match rifles were the most accurate round-ball rifles ever made.

Several weeks ago I received a post card which read as follows:

"Hello Boys!
A big shooting match at the
Raven Rock next Saturday, for
Two fat sheep. Come! Tell all
The boys and let's have a big match.
Yours for luck,
GILBERT ANGEL."

Here, in one of the most picturesque spots in America, is still held the old-time shooting match, in which the long, heavy, soft-metal-barreled match rifles are still used. Rifles that would delight the eye of "Deer-slayer"!

Raven Rock is a high cliff where for years the ravens had nested and reared their young, until, with advancing civilization and the building of highways into this mountain fastness, they had passed on, no one knows where, leaving only their name in memory of the days when the air about the place was black with these somber-winged birds. The mountain trail which gained the summit through a cleft in the rocks has been replaced by a fine highway to the summit of the Cumberlands, and on westward across the broad plateau.

No more wonderful panorama is seen than that viewed from the Raven Rock. Southward stretches the Sequatchie Valley for more than 70 miles. Midway of the valley runs the Alvin York Highway, named for Sergeant York, who had learned to handle a rifle in the Cumberlands long before his country called him overseas to become the nation's hero. He is one of the mountain men whose deadly skill with the rifle was acquired through daily use of the weapon in the hills around his home.

As our car topped the mountain on the way to the match, the sharp reports of rifles were heard, and the air was pungent with the smell of black powder. The big match was on, and we were invited to take part. One dollar was the entry fee.

There were several muzzle-loading rifles in our party; one especially, "Long Tom," the property of the writer, and a famous match rifle made by Enoch Hardin, a noted maker of match rifles in his day. This rifle has a 56-inch barrel, is .40 caliber, and the grooves are seven in number, with a twist of one-half turn in the length of the barrel. It weighs 20 pounds, and is a typical 60-yard mountain match rifle. This rifle was rescued from an old outbuilding, where it had been placed by its owner after his last match, many years before. This man had cleaned it well, and then poured it full of melted beef tallow, which had preserved it from the ravages of time. "Now Old Tom only needs a man behind it," as one of the mountain men good naturedly remarked to me, "to make it shoot plumb center."

The shooting range is situated in a little cove surrounded by higher ground. Sixty yards, with a rest, or 40 yards offhand, is the distance. A big fire of logs was burning when we arrived, as the air was crisp and invigorating. Some of the men were burning their boards in the fire to make a black surface for their targets. A charred board is an intense black, and the aiming point, or bull's-eye, of white cardboard shows up clear and sharp on the black surface. Some were moulding bullets; others cleaning their rifles.

Men had come from all sections of the mountains, ridges, and valleys. Some had come on foot, others on horseback, and some even in motor cars, now that highways have been built into the mountains.

These mountain men love the rifle, and will go miles to take part in a shooting match. Each man pays his entry fee of $1, which entitles him to 5 shots. He then takes his board, which has been blackened in the fire, fastens on it his bull's-eye of white cardboard, writes his name on it, and gives it to the man who marks the targets. He is allowed two practice shots, as they are called. He calls for his board by calling out his name to the marker. It is set up for him, and he shoots his two sighting or practice shots. He then makes his "cross," which consists of two knife cuts in the black board, crossing each other. If his two practice shots cut into each other, or are very close together, he will move his bull's-eye to a new place on the board, and make the cross through the two bullet holes, or between them if they are not together. He is then ready to shoot for "meat," and has 5 shots for counters—one shot for each choice: two fore quarters, two hind quarters, and the hide and tallow. If his first shot is close enough to the center of the cross to cut all four lines, which would be called a "four-point center," or if only close enough to pull wood from the center, he is instructed by the marker to move his cross. This is done in order that it may be possible to measure each shot, for, if 2 shots should break into the cross, it would be impossible to measure each shot. The marksman then makes a new cross on his board, moving his bull's-eye or aiming point also. He is allowed to inspect his target after each shot, and can move the cross at any time. The match progresses with much good-natured bantering, and many small bets are made as to whether or not a certain marksman will shoot to within a certain distance of his cross. Each man shoots in turn, calling for his board to be set up.

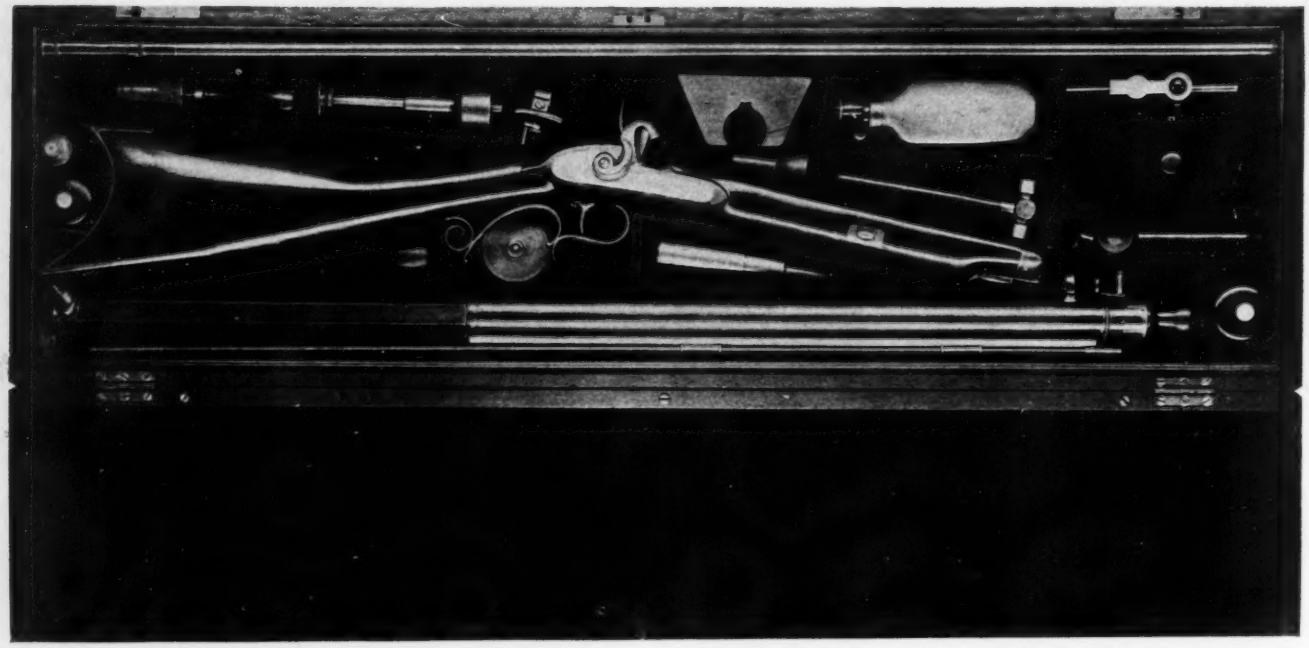
Much of the fine accuracy of these old-time rifles depends upon the skill in loading. The shot pouch, powder horn, and charger are a very necessary part of the equipment. The powder horn is worn next to the body, so that the temperature of the powder may remain as uniform as possible, as it has been found that the temperature affects the strength of the powder. A difference of an inch or so in center of impact has been noticed when shooting a muzzle-loading rifle on a cold, and on a warm, day.

Bullets are carefully moulded, and so marked in the mould that they can always be loaded in the same position, neck down. The powder is carefully measured in the charger, great care being taken that the amount is the same each time. The charger is poured rounding full from the horn, and then leveled off. This is a very accurate way of measuring. Some few have the copper powder flask with the measuring nozzle. One man gives his flask five taps against his leg to settle the powder in the charger, and claims it is as accurate as if each charge were weighed.

There are different methods for determining the proper amount of powder for use with a certain size of bullet. One method is to use the amount of powder that it takes to just cover a bullet when laid in the palm of the hand and the powder carefully poured over it. After this quantity of powder has been determined, a charger is made to hold just this amount. Another rule is to use a certain number of moulds full of powder, using the mould in which the bullet was cast. Large balls call for three moulds full; small ones, four moulds full, etc., a charger being made in each case to hold the exact amount of powder.

The patching is usually of drilling, of a certain thickness for each individual rifle. This is wet with saliva, laid on the muzzle of the rifle, and the bullet seated with a starter, the latter being so formed that it always seats the bullet and patch to the same depth in the bore. The edges of the patching are then gathered together in the left hand and cut off close to the muzzle with a knife, the edge of which is beveled so as not to injure the end of the barrel. This makes a circular patch with the bullet seated exactly in the center; and the patch is always the same size. A bullet loaded off center of the

"Measuring the match"



N. J. Whitmore rifle in case with accessories. One of the finest examples of the handmade target rifle

patch will shoot wild. The rifles are not fired rapidly, but are allowed to cool between shots, so that the temperature of the barrel is as nearly the same for each shot as possible.

Open sights only are used. The front sight is of the wide blade type, the rear sight having a rectangular slot in which the front sight is accurately centered. The top of the front sight is so held as to show an equal strip of white at the top and at each side of the bull's-eye. This sight was invented by Enoch Hardin about forty-five years ago, who told the writer that he had laid awake at night trying to figure out how to beat a competitor that was getting the better of him in the matches. Both front and rear sights are shaded by a piece of sheet iron so bent as to slip on over the barrel. This makes the sights stand out clearly and also eliminates the problem of changing lights on them. Wherever the location permits, the targets are placed to the south of the shooter, so that they will be shaded, and all shooting be done toward the light. There were many noted marksmen at this match on Raven Rock. There was Gilbert Angel, who shot a 24-pound gun called the "Jake Keedy Gun," and who cut center three times in succession. There was Uncle Byrd Freeman, who rode up from the valley, bringing his pet rifle, "Old Beck," which had a 58-inch barrel, bearing the outside hammer marks and all, just as it had been welded by the maker, but with the inside as true as could be made. Uncle Byrd shot a fine match, all shots being cut together; but he cut the cross only once. Then there were Bert Fann and Rudolph Holt, from Waldens Ridge—both fine shots. Holt could never get a barrel long enough to suit him, so he welded two barrels together, end to end, bored and reamed out this long barrel, and rifled it; and now he has a fine shooting rifle with a 60-inch barrel. The only trouble he says he has with it is that, as he is near-sighted, it takes him so long to see the front sight that it is always dark before he gets his 5 shots fired. I have never seen *a short-barrel rifle win a match;* and while these may be just as accurate as the long barrels, they have no place in one of these old-time matches. All the shooting is done from a rest, either from a prone position, resting the muzzle on a log and the elbows on the ground, or from a shooting bench, which permits the shooter to be seated, and affords an elbow and muzzle rest.

There were 25 contestants in that match, and it was almost dark before the shooting

Uncle Rube Swofford and his rifle "Center"

Uncle Byrd, a famous rifle shot, and his rifle "Old Beck"

Equipment for target rifle: Mould, swage, false muzzle, starter, nipple wrench, powder flask and screwdriver, etc.

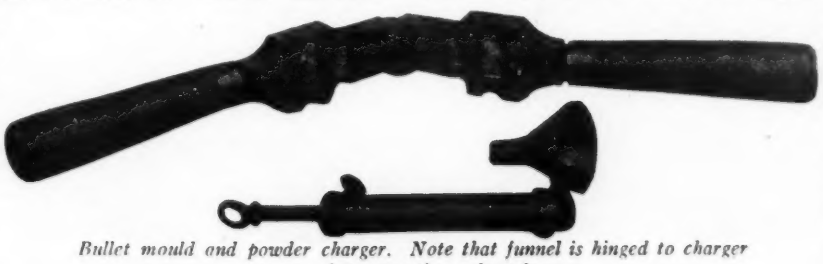
was finished. Then came the measuring to determine the winners. This is a very particular job, and was especially so in this match, as the shooting had been very close and a number of crosses had been cut. Dividers are used for measuring. Each man that has a close shot furnishes a half bullet of the size his rifle uses, on the cut face of which the center has been marked. This half bullet is placed in the bullet hole in the board, and the cross lines extended across the bullet. Then the measurement is taken from the center of the bullet to the center of the cross lines. The bullet that has its center nearest to the center of the cross wins first place; and so on until the best 5 shots have been measured. Fortune favored the writer in this instance, his second shot cutting a dead 4-point center, winning first place, though his fourth shot, only a little more than an eighth of an inch off, did not get anything. This will give some idea of the fine accuracy of these old-time match rifles, and the closeness of the contest.

There was a sixth prize in this match, which consisted of the lead cut out of the tree against which the targets had been placed. And here is where a little superstition enters in, for all firmly believe that the lead shot in a match, if moulded into bullets and shot in another match, will never win anything. This lead is all right to use in hunting, but never in another match! During a match everything is taken good naturedly, and no finer bunch of sportsmen ever gathered together than men who take part in these old shooting matches.

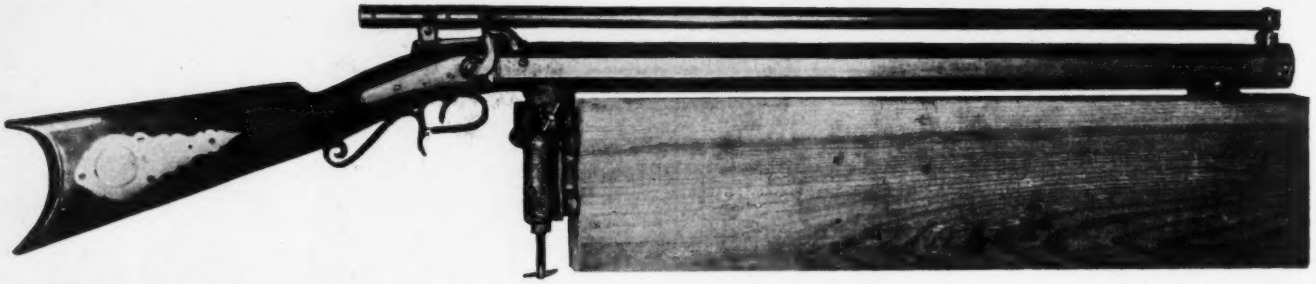
The American target rifle, as developed in the late percussion period, had the greatest accuracy and power of any muzzle-loading rifle, and it is doubtful if its accuracy at medium ranges has ever been surpassed. The earliest specimen in the line of development of this rifle that has come to the notice of the writer is a fine piece by Tryon, of Philadelphia. It is of the late flintlock period, and must have been made after 1811, as that was the year Tryon established his rifle works in Philadelphia. This rifle has a cast-steel barrel 34 inches in length, caliber .40, and has narrow grooves which make a three-quarter turn in the length of the barrel. The end of the barrel is turned round and fitted with a brass starter of the piston type. That it used the sharp-pointed ball is indicated by the end of the starter-rod, which is reamed out to fit a ball of that type. The rifle has a fine rainproof lock by Parker, stock of curly maple, with a drop of 5 inches. The weight is 14 pounds. This is quite a departure from the long, heavy-barreled flintlock match rifle, and is the only specimen known to the writer.

An example of the next step in the line of development is a rifle marked "Edward Wesson, Northboro, Mass.," and dated 1826. The number 225 is stamped on the barrel. The barrel has a length of 37 inches, and is marked "Cast Steel." It has six grooves .015 inch in depth, and the rifling makes a three-quarter turn in the length of the barrel. The lands are twice the width of the grooves; the caliber is .44. This rifle uses the sharp-pointed picket ball with slightly rounded base. Moulds, swage, and charger are a part of the equipment; and the charger has a loading-funnel attached. The muzzle of this rifle also is turned and fitted with a brass starter, the same as the Tryon rifle. Its weight is 16 pounds. So great was the improvement in accuracy of this type of rifle and ball that a powerful incentive was given the gunmakers to continue its development. Experiments were conducted with every conceivable shape and design of ball, with different pitches of rifling, varying widths and depths of grooving, different lengths and weights of barrels, as well as powder charges, to develop greater accuracy and range.

The next step in the improvement of the rifle was the false muzzle, said to have been invented by Calos Clark, of Windsor, Vt., in 1836. The earliest rifle with this attachment known to the writer is one by Frank Wesson, of Hartford, Conn., and which has the name "Clark" stamped on the false muzzle. The invention must have spread rapidly, as this rifle was made in 1837 and is numbered 433. The false muzzle is made after the barrel is bored and ready for rifling. Four small holes are drilled in the muzzle end of the barrel as near the outside edge as possible. A piece is then cut off the barrel of the same length as the outside diameter of the barrel. Four steel pins are now fitted in the holes in the piece that was cut off, and this piece is clamped to



Bullet mould and powder charger. Note that funnel is hinged to charger for convenience in using



Brockway rifle. This rifle uses the two-strip paper patch, and is adapted for the Berdan primer. The machine rest was made for the rifle

the barrel, the pins fitting in the holes in the barrel which were drilled before the piece was cut off, and which were drilled deep enough to go on through the length that was to be cut off, and into the barrel proper. The grooves are now cut in both barrel and false muzzle, thus making the grooves in the latter correspond exactly with those in the barrel. The bore of the false muzzle is now beveled, or countersunk, to permit the loading of the bullet and patch by the aid of the starter, so that the patch is not cut and the bullet is accurately centered in the bore of the rifle each time it is loaded, with the axis of the bullet coinciding exactly with the axis of the bore. The false muzzle is then removed before the rifle is fired.

The use of an elongated bullet—that is, a bullet in which the length is greater than the diameter—had been tried many years before. Lautman, writing in 1729, recommended the eliptical ball, and the Englishman Robbins in 1742 recommended a ball of this type. But the difficulty of loading at that early date prevented its use to any extent, and it was soon discarded. It remained for the ingenuity of the American gunsmiths to develop a rifle and a method of loading it with this type of bullet so as to attain the greatest accuracy and range of any muzzle-loading rifle. In this they reverted in a way to the methods employed in Central Europe. The bullet was forced into the grooving in loading, and this still holds true with all rifled arms. The bullet must be made to take the grooves and be perfectly centered in the bore, either in loading or upon being fired.

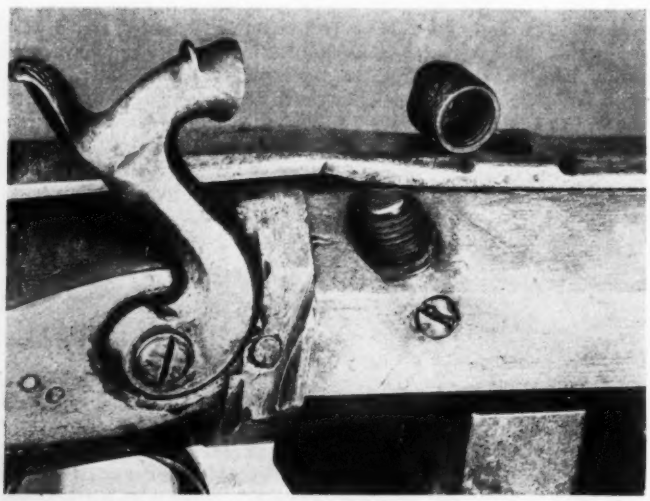
The so-called gain, or gaining, twist was next developed in the target rifle. Chapman gives Edward Wesson the credit for first employing this system of rifling. In 1855 the Fishers, of Virginia, were advertising the gain twist in rifles of their own make. It is doubtful whether it can be credited to any one man, as it had been tried many years before. The object of the gain-twist method of grooving was to permit the use of heavy charges of powder without the danger of the bullet stripping, or being driven across the lands. J. W. Stillman, writing in the *Atlantic Monthly* in 1859, says that the American gunsmith has solved the problem by adopting the gaining twist, in which the grooves start from the breech nearly parallel to the axis of the bore, and gradually increase in rate of twist, until at the muzzle they have a much sharper pitch. In this way the rotation of the bullet is begun very gently, with less tendency for the surface metal of the soft bullet to be stripped off in the grooves. The gaining twist is the greatest improvement since grooving was successfully applied. To reject it is to reject something indispensable to the best performance of the rifle.

The barrels of all these rifles were "freed"; that is, in the final boring of the barrel a slightly deeper cut was taken from the breech up to within 1½ or 2 inches of the muzzle. The idea was to reduce friction and permit of easy loading, the plunger of the bullet starter carrying the bullet through the tighter muzzle section, and on into the looser, "freed" portion of the barrel below.

It was soon found that the sharp-pointed picket bullet with its straight lines was not the best form, for if loaded slightly off center each revolution would throw the point into a wider circle, and the bullet would become more erratic than a round ball. Therefore the point of the cone was gradually brought to more of a curve, and the so-called "sugar-loaf" bullet was the result. Very fine accuracy was developed with this new bullet, and Stillman records two targets shot by rifles made by Morgan James, of Utica, N. Y. The first target was shot by a rifle of 60-gauge, 25 shots being fired, the average deviation being 1¼ inches; the second was shot by a rifle of 90-gauge, the average being 8/10 of an inch, both at a distance of 220 yards. Stillman also states that in the northern part of the State of New York the practice at shooting matches was at turkeys at 100 rods (550 yards); and that a good marksman was expected to hit on turkey on an average of every three shots.

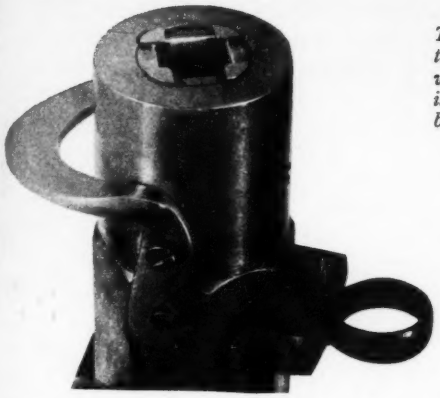
By 1860 a new bullet had been designed that far surpassed the sharp-pointed sugar-loaf bullet in accuracy, and had been universally adopted in various calibers and lengths to suit each individual pitch of rifling. One of the most accurate bullets of this new type as designed for a certain rifle measures .420 in diameter at the base, .200 at the point, is .735 in length, and weighs 225 grains. The rifle that used this ball would be considered a 60-gauge, as measured by the round-ball method, as round balls of this size would run sixty to the pound. Another bullet is .500 in diameter at the base, .250 at the point, is .950 in length, and weighs 1 ounce and 48 grains.

By this time the length of barrels had been reduced to almost a standard, although opinions were various on this subject. Experiments had developed the fact that a barrel of 26 inches was the best for the strongest shooting, and for the best accuracy one of 34 inches, while for a combination of both, a barrel of 30 inches was considered the best length.



The method of using the Berdan primer, showing primer in place ready for the cap to be screwed down

Telescope sights were in use, and extended the full length of the barrel; and many of them were interchangeable with the peep and covered bead front sights. A telescope sight brought out by Daniel Wood, of Rochester, N. Y., in 1861, especially designed for the American sharpshooter, had a range-finding and elevation device consisting of eight horizontal cross hairs parallel to each other and at certain definite distances apart. These cross hairs were intended to indicate the fall of the ball for different ranges, and were so spaced as to exactly correspond with it. When used as a range-finding device, the height of an object as measured between the cross hairs indicated the range. The telescope was also used in



These illustrations show the Brockway two-part false muzzle, and the manner in which the two-strip paper-patched bullet is loaded. The lower picture shows the bullet in place ready to be seated by the starter

correcting shots on the target. If the first shot was low, the rifle was held immovable with the cross hairs on the center of the bull's-eye. The elevating screw was then turned up until the cross hairs centered the bullet hole. In this way the correct elevation was secured; and if the calculation had been correct the next shot should strike the bull's-eye. If the distance were so great that the bullet hole could not be seen, something easily seen was placed over the bullet hole, and the adjustments made. Try this some time when sighting in a rifle, and see how much ammunition you will save.

The following data will give some idea as to how accurately range and wind variation had to be judged to make good scores when using these rifles. A test was made of a certain rifle, the barrel of which weighed 8 pounds and was 29 inches in length. A conical ball was used weighing 65 to the pound, with a charge of 2½ inches of Hazard's No. 1F powder. At 110 yards the drop of the bullet was 3 inches; at 220 yards, 30 inches; and at 440 yards, 18 feet! All this will vary, of course, with different rifles, charges of powder, weights of bullet, etc.

Back in those days flags were used on the range, set every 40 yards between firing point and target. These were made of red cotton cloth about 6 feet long, and of cylindrical shape, 3 or 4 inches in diameter. They were kept spread by the use of wire rings sewed inside. These flags tapered slightly, and had a slit in one side in which a weight could be placed in case of a heavy wind. They were fastened to the edge of a strip of tin, 3 x 10 inches, on one end of which were brazed lugs to slip over a rod fastened to the top of a pole. The strip of tin acted like a weather vane and was free to turn in any direction. The idea was by the aid of these flags to select an average wind velocity, and fire when the flags showed an even wind over the entire range.

That the old-time riflemen could dope wind is evidenced by that famous match in 1886 between Warner and Perry, at Warren, Ohio. The match was a 50-shot affair for $500 a side; distance, 220 yards. Though it was a very windy day, Warner won the match, placed his 50 shots in a group measuring 42 inches; and Perry's group was just over 50 inches. There was always great rivalry between Warner and Perry, Warner always claiming that Perry copied him. There are other similar achievements recorded for both. It is recorded by Barber that at a meeting of a rifle club in Ohio just before the beginning of the Civil War, 30 men put 10 shots each inside of a 10-inch circle at 300 yards. It is also recorded that at a distance of three-quarters of a mile a number of shots have been placed in a flour barrel, without a miss.

With the breaking out of the Civil War many sharpshooting regiments and companies were organized in the Federal Army. These were composed of picked men from various States—men of known ability as marksmen. In Berdan's two regiments of sharpshooters no one was permitted to join who could not place 10 shots in a target, measuring 50 inches or under, at a distance of 200 yards—an average of 5 inches to the shot. It is recorded that one of these men, by the name of Townsend, fired a 5-shot group at 200 yards that measured 3½ inches. Two companies of this regiment furnished their own rifles, which were the heavy target rifles with false muzzles, and telescope and peep sights.

Complete composite bullets, and component parts, for Brockway rifle

Then there were the Andrew Sharpshooters from Massachusetts—a company of picked men named for Governor Andrew of that State. Each man provided his own rifle. A description of these rifles published in a history entitled, "Massachusetts in the War," says that they were very heavy, and were considered to be the most efficient rifles known. They weighed from 20 to 70 pounds, and were necessarily fired from a rest. They were made by various gunsmiths in different parts of the country to suit each individual. They were muzzle-loading, shooting a conical ball with a patch, and propelled by a heavy charge of powder. An expert in their use could load, aim, and fire about once in 2 minutes. It is also recorded that at Yorktown many of the Confederate batteries were silenced by the sharpshooters using these heavy rifles. One incident is related in which some of the Federals, working in the trenches, were annoyed by a Confederate sharpshooter who had posted himself in a tree 800 yards distant, from which point he could make their position an uncomfortable one, while it was impossible for them at that distance to distinguish him with the naked eye among the branches of the tree. Two of Andrew's sharpshooters were put in the trench, a telescope sight held on the man in the tree, and the first shot brought him down.

In the Western Federal Army, General Fremont organized a regiment of picked men selected from many different States, and known as "Birge's Western Sharpshooters." They were first armed with the American target rifle obtained from the sporting-goods stores of St. Louis. These rifles varied in caliber, and each man carried a mould to fit his rifle.

Reports of the officers of both the Confederate and Federal armies contain the information that the fire of the sharpshooters was very accurate. After the war these muzzle-loading target rifles were still preferred for fine target work to the breech-loading rifle that was fast coming into use.

One of the last developments was the two-strip paper patch and

(Text continued on page 47, illustrations on page 20)

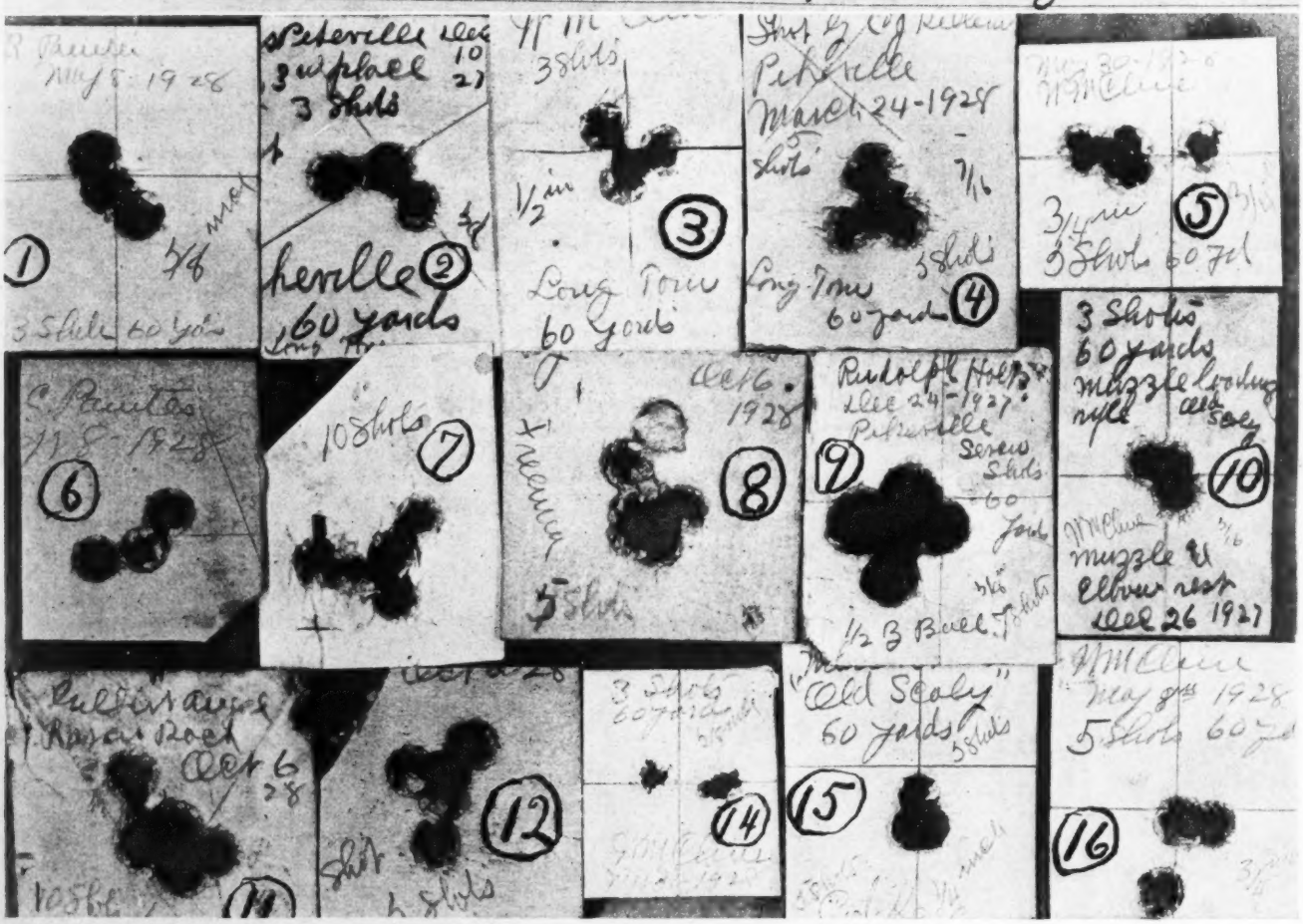
The group of 5 consecutive shots shown above were fired by Mr. E. Snider at a range of 186 yards on the 15th of January 1930 using a muzzle loading target rifle owned by Mr. Walter Cline of Chattanooga.

The charge used consisted of a linen patched picket ball weighing 225 grains and 65 grains of Kings Semi-Smokeless powder of FFg granulation giving a mean muzzle velocity of 1638 ft./second.

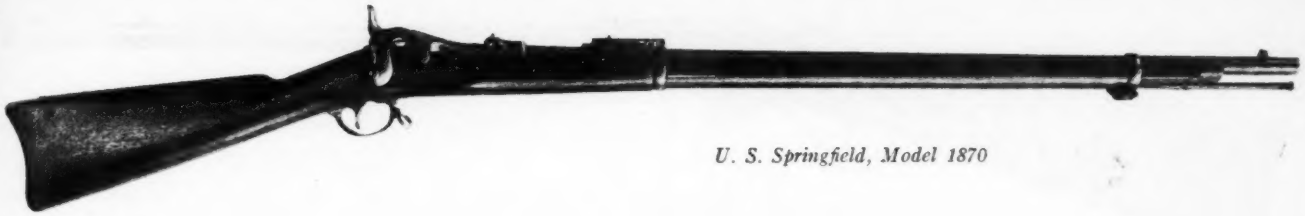
Telescopic sight, muzzle and breech rest.
Extreme horizontal 1-1/8"
Extreme vertical 7/8"
Mean radius 7/16"

Weather slightly cloudy with a light variable wind from 1 o'clock. Temperature about 30° F. Time 4:00 P.M.

Witnesses
Walter M Cline — o — Clyde T. Erwin
Martin T. Mathews Philip O. Quayle



Upper: Result of Dr. Quayle's test. Lower: Targets shot in actual matches. The groups as shown are about actual size



U. S. Springfield, Model 1870

Our Rifles at the Birth of the N. R. A.

By

LT. COL. TOWNSEND WHELEN

Ordnance Department, U. S. A.

PERHAPS nothing will so illustrate the tremendous strides which have been made in small arms and small-arms marksmanship since the founding and incorporation of the National Rifle Association of America in 1871 as a description and review of the rifles in general use in the United States in that year.

The Civil War, like all other prolonged wars, had lent great impetus to inventive genius. The North and the South had entered that conflict armed with muzzle-loading rifled muskets as the arm of their infantry troops. At that time (1862) the percussion-lock muzzle-loader was still the weapon of the sportsman, the frontiersman, and the target-shooter. But during the Civil War a number of breech-loading mechanisms were developed, and were issued to Union troops, chiefly to the cavalry. The more important and successful of these were the Spencer, the Henry, and the Sharps, all using rim-fire ammunition, the first two being magazine arms. All were rather crude as compared with modern arms.

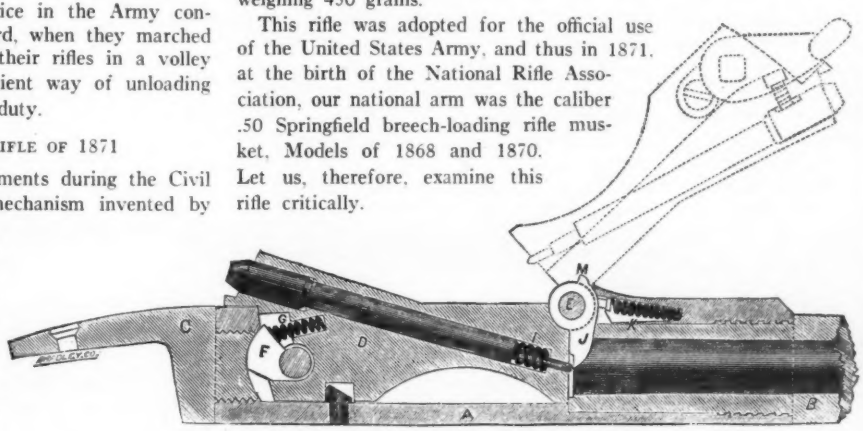
From the period of the Civil War to 1873 the breech-loader was in its infancy. Various boards of officers were trying a great multitude of breech mechanisms, the center-fire cartridge was being developed, real accuracy in breech-loading arms as we now know it was nonexistent, target-shooters were still clinging to their muzzle-loaders, there was no such thing as target practice or marksmanship instruction, and no magazine devoted to rifle-shooting. Those who could shoot well with the rifle had taught themselves to hold, aim, and touch off a set trigger. Target practice in the Army consisted of the old guard, when they marched off duty, discharging their rifles in a volley at a target, a convenient way of unloading the rifle after sentry duty.

THE ARMY RIFLE OF 1871

One of the developments during the Civil War was a breech mechanism invented by Mr. Erskine S. Allin, master armorer at Springfield Armory, by means of which the percussion-lock muzzle-loading rifled muskets used at that time could be converted to breech-loaders to use a metallic cartridge, retaining lock, stock, and barrel of the original rifle. The barrel of the muzzle-loading rifle was cut off about 3 inches ahead of the breech, and the Allin breech mechanism was screwed to the breech of the shortened barrel. This Allin mechanism was very similar to the receiver and breech block seen in the old .45-caliber Springfield rifle, with which most of our older riflemen are familiar. Shortly after the Civil War a large number of caliber .58 muskets were altered to breech-loading by the Allin system, and were adapted to use a caliber .58 rim-fire cartridge.

In 1868 a large number of the old Civil War muskets, Model of 1863, were altered to breech-loading by substituting a new barrel 32½ inches long, of caliber .50, rifled with three grooves having a twist of one turn in 48 inches. To this barrel was screwed a receiver and breech mechanism of an improved Allin system. The old stock and lock of the Model 1863 musket were retained. This weapon was known as the Springfield breech-loading rifle musket, Model of 1868. In 1870, the breech mechanism was still further improved, and was called the Model of 1870. These two weapons used the .50-70 Government center-fire cartridge consisting of a copper case, 70 grains of musket (black) powder, a copper cup, ½ grain of percussion composition, and a lubricated lead bullet weighing 450 grains.

This rifle was adopted for the official use of the United States Army, and thus in 1871, at the birth of the National Rifle Association, our national arm was the caliber .50 Springfield breech-loading rifle musket, Models of 1868 and 1870. Let us, therefore, examine this rifle critically.



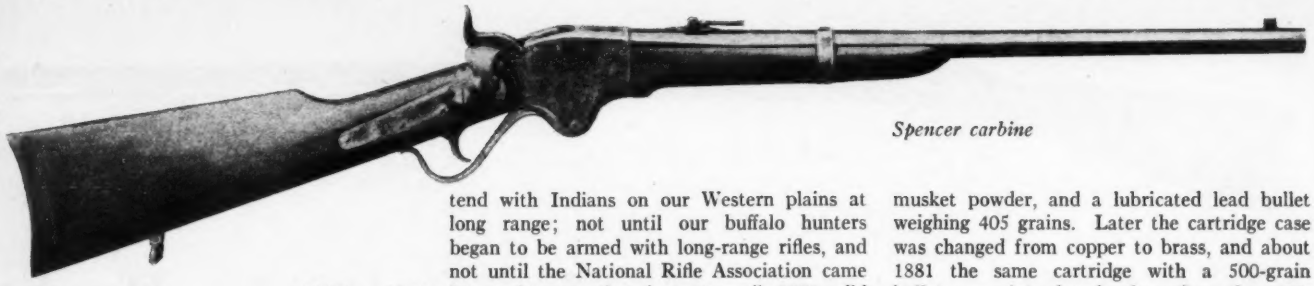
Springfield breech-loading alteration, Model 1868

The cuts show the complete rifle and the details of the breech mechanism. The breech block, hinged at the top of the front of the opening of the receiver, is held in the opening, its rear being supported against the back thrust of the cartridge by the rear wall of the receiver, and held from rising by the cam latch F. When the cam latch is pushed upward, the breech block rotates on its hinge to the position shown by the dotted lines in the drawing, operating the extractor J, which throws out the fired cartridge case, permitting a new cartridge to be placed in the chamber. The breech block is then closed, the rifle cocked and fired. A practiced soldier could fire this rifle twelve to thirteen times a minute, loading from the cartridge box. The record was 23 shots a minute.

The rear sight consisted of a standing open sight for 100 yards, and a hinged leaf bearing a 200-yard notch at its bottom, and a sliding bar with open sight. The bar slid up and down the leaf, which was graduated for 300, 500, 700, and 900 yards. There was no wind gauge. The complete rifle without bayonet weighed 9 to 9¼ pounds, the barrel being 32½ inches long.

The .50-caliber cartridge was known as the "Martin's Center-Fire," and was made at Frankford Arsenal. The primer arrangement was very crude, and not at all like our present center-fire primers. The head of the copper case was solid and flat, looking like our present rim-fire cases. The percussion composition was held in a cavity in a straight bar of tinned iron pressed closely against the head of the case inside. The firing pin indented the center of the case and thus crushed the percussion composition against the iron bar.

In giving the ballistic characteristics of this rifle and cartridge I also give for comparison similar characteristics of the United States rifle, caliber .30, Model of 1903, National Match type, with 1930 National Match ammunition (designated "1930"):



Spencer carbine

	1868-70	1930
Muzzle velocity, f. s.	1,240	2,700
Velocity at 500 yards, f. s.	763	1,750
Trajectory over 1,000 yards.		
Height at 500 yards	74 ft. 3"	10 ft.
Accuracy:		
300 yards, mean radius, inches	7.04	1.50
500 yards, mean radius, inches	13.09	2.30
1,000 yards, mean radius, inches	32.7*	5.00

*Sixteen shots out of 20 struck the target 18 x 12 feet. With Model 1930 National Match ammunition, most 1,000-yard groups in good weather will be contained in a circle about 12 inches in diameter.

In shooting with this rifle it was considered that the marksman was doing quite well if he kept half of his shots on the silhouette target of a man at 300 yards, or all of them on a 6 x 6-foot target at 500 yards. Under exceptional conditions, scores up to about 45 were made at 500 yards. (Recollection from scores I remember having heard made in the New York National Guard when I was a boy.—T. W.) The recoil of the rifle was quite severe. A modern shooter would call it "tremendous." In 1870 it was measured by a spiral spring applied to the butt of the musket, and was recorded as 95 pounds! It is noted that "the recoil is only 5 pounds greater than that from .58-caliber muzzle-loading musket, Model 1855."

This, then, is the weapon that our Regular Army may be aptly said to have been obliged to contend with when rifle marksmanship had its birth in 1871. Needless to say, shooting in the Army did not progress very fast until the adoption of a quite similar but far superior arm in 1873. Nor did the efforts of the fathers of the N. R. A. produce much in the way of results until our Army and our National Guard were armed with this latter weapon.

In stating that rifle marksmanship was born in 1871, I am not unmindful of the fact that quite a lot of what we might call "backwoods marksmanship" was indulged in, particularly on our frontiers, and among countrymen, since the introduction of the rifle into America shortly before 1750. This shooting was almost invariably at short range —seldom over 20 yards—with muzzle-loading arms, having set triggers. It was a test of ability to hold and keen eyesight. Little else entered into it. Not until the officers and scouts of our Regular Army began to contend with Indians on our Western plains at long range; not until our buffalo hunters began to be armed with long-range rifles, and not until the National Rifle Association came into existence—that is, not until 1871—did we begin to develop a system of rifle marksmanship. Then and not until then did we begin to hear about careful trigger-pull, sight adjustment, wind allowance, rapid fire—words now common among riflemen. Really modern rifle marksmanship had its birth simultaneously among the officers and men of our Regular Army serving in our West, and among the small coterie of rifle shots forming the N. R. A. and headed by General Wingate; and these men did not progress far or fast until the introduction of a new rifle in 1873.

THE SPRINGFIELD RIFLE, CALIBER .45

In 1872 a Board of Officers for Selecting a Breech-Loading System for Muskets and Carbines was convened by General Orders No. 28, Adjutant General's Office, War Department, Washington. The board sat for almost a year, critically examined and tested 99 different rifles, and finally recommended "that the Springfield gun, No. 99, of all those presented, is the best suited for our military service." The report was approved by the Secretary of War May 19, 1873.

The rifle thus chosen is well known to all our older riflemen. In fact, members of the National Rifle Association can still purchase it through the Director of Civilian Marksmanship. It was the arm of our Regular Army from 1873 to 1892, and our National Guard was armed with it until about 1903, and a sterling weapon it was. We learned to shoot with it.

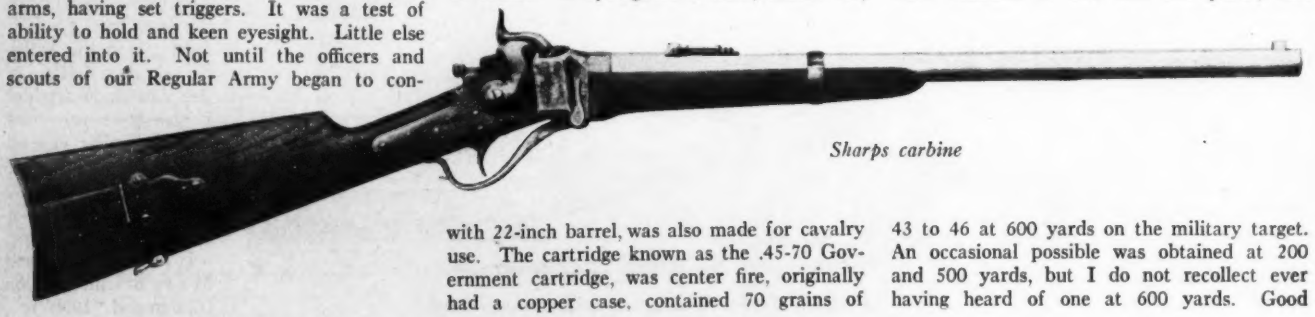
This rifle was officially known as the "Springfield Rifle, caliber .45." It had a breech action similar to that of the Springfield breech-loading musket, Model of 1870, but with a few minor improvements. The barrel was 32½ inches long, of .45 caliber, the rifling consisting of three plain concentric grooves equal in width to the lands, .005 inch deep, with a uniform twist of one turn in 22 inches. A Springfield carbine, caliber .45, with 22-inch barrel, was also made for cavalry use. The cartridge known as the .45-70 Government cartridge, was center fire, originally had a copper case, contained 70 grains of musket powder, and a lubricated lead bullet weighing 405 grains. Later the cartridge case was changed from copper to brass, and about 1881 the same cartridge with a 500-grain bullet was introduced, thereafter the 405-grain cartridge being usually used in the carbine, and the 500-grain cartridge in the rifle.

The following are the characteristics of the rifle and cartridge:

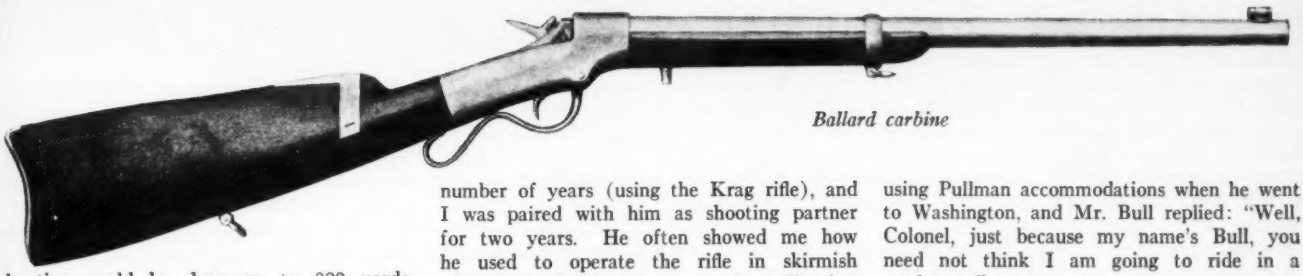
	405-*gr.* *bullet*		500-*gr.* *bullet*
	Rifle	*Carbine*	*Rifle*
Muzzle velocity, f. s.	1,364	1,150	1,315
Remaining velocity, 500 yards, f. s.	770	697	886
Remaining velocity, 1,000 yards, f. s.	536	500	711
Trajectory over 1,000 yards.			
Height at 500 yards, feet	63.8	48.5	43.5
Mean radius at 500 yards, inches	9.07	11.7	7.6
Mean radius at 1,000 yards, inches	26.34	...	21.4

From the start this rifle was superior in all respects to the .50-70 rifle of 1870, and our troops and civilian riflemen were able to shoot very much better, the rifle giving a great impetus to rifle practice. For the first time we now see a practical Small-Arms Firing Manual issued to troops for their instruction. But it was not until about 1883 to 1885 that ammunition was sufficiently improved, and aperture rear sights with windage adjustment were provided, so that really creditable scores as we now regard them began to be the rule. About then, two riflemen discovered that by placing an empty cartridge case, having a rubber tube fastened to its rear, in the chamber, and breathing gently through the bore between shots, the heavy black-powder fouling could be kept moist, and 10 consecutive shots could be fired with excellent accuracy even on very dry days. Before that, the fouling "caked," so that good accuracy could not be obtained for more than about 5 rounds.

By about 1885 the Regular Army, the National Guard, and a few civilian riflemen were shooting splendidly with the .45 Springfield, and many military competitions were held in various parts of the country, particularly at Walnut Hill, Mass., Creedmore, N. Y., Sea Girt, N. J., and Belleview near Omaha, Nebr. Scores as high as 45 to 48 were common at 200 and 500 yards, and 43 to 46 at 600 yards on the military target. An occasional possible was obtained at 200 and 500 yards, but I do not recollect ever having heard of one at 600 yards. Good



Sharps carbine



Ballard carbine

shooting could be done up to 800 yards. Mr. A. L. Woodworth, proof assistant at Springfield Armory, informs me that many years ago he qualified as Sharpshooter with this rifle with a score of 48 at 800 yards, which was considered a very remarkable score. One thousand yards was beyond the capabilities of the rifle and ammunition, however, because the angle of fall of the bullet was so great that in effect the 6-foot target presented only about 4 feet of vertical height, and the diameter of a group of shots under ideal conditions was just about 4 feet at that range. It was very seldom that anyone got 10 consecutive shots on the 6 x 12-foot target at 1,000 yards.

I qualified as Sharpshooter with the .45 Springfield rifle in 1896, and I shot it continuously in practice and in competitions from 1896 to 1902 in the Pennsylvania National Guard, so I know it first hand. It had what we would now call heavy recoil, but we did not mind it in those days. The trigger had a very long but smooth drag, and one had to ease it off gradually, feeling the sear sliding off the hammer notch as he did so. Breathing through the barrel was necessary on dry days. The best ammunition was freshly hand-loaded, fresh lubricant on the bullets being a great advantage. The best powder was Hazard's FG black powder, the next best being du Pont. Winchester ammunition was very well liked also. But most of our practice ammunition was made at Frankford Arsenal, and it had a tinned case, and was pretty good, too. In shooting prone, we used the gun sling much the same way that we do today, and in shooting offhand, many riflemen held the left arm extended, elbow straight, left hand gripping far out on the fore stock.

The only rapid fire we did in those days was skirmishing. A rifleman accustomed to the rifle could fire 12 to 13 aimed shots per minute. Perhaps the best known "rapid-fire artist" of those days was Ordnance Sergt. William I. Davidson, of the Regular Army, better known as "Gun Sling Dave." Davidson and I shot together on the Army Infantry Team for a number of years (using the Krag rifle), and I was paired with him as shooting partner for two years. He often showed me how he used to operate the rifle in skirmish when he made his great reputation. He shot in the "Texas grip" position on his back, feet to the target, and used the gun sling around his legs in such a way that the rifle was almost held in a vise. On reaching the firing point in skirmish, he would jump up and swing the gun sling around his legs, landing on his back. He had all his fingers and his mouth filled with cartridges, and cartridges behind his ears as well. He operated the breech block and cam latch with his right hand, fed the cartridges into the chamber with his left hand, and pulled the trigger with his right thumb. Sometimes he fired as high as 25 shots in a minute.

But probably the most expert of all the riflemen of the day with the .45 Springfield was Freeman R. Bull. Mr. Bull was an expert gaugemaker and machinist at Springfield Armory. Such was his skill that he could make a complete rifle himself. Because of his great interest in rifles and rifle-shooting, and because he was such a remarkable rifle shot, he was placed in charge of the experimental department at Springfield Armory. He had charge of targeting all rifles, and all experimental work. It is interesting to note that Mr. Bull himself rifled all the Springfield rifles used by our International Rifle Team that competed with England in 1883. Mr. Bull was known as a "human machine rest." Actually, he could shoot the rifle more accurately with muzzle and elbow rest than it could be shot from the machine rests of those days. At 500 yards, it was quite common for him to place 10 consecutive shots in a 6 x 8-inch circle, a feat that almost no one else ever succeeded in doing, and that would tax the skill of our most expert shots of today using heavy barreled Springfield Model 1903 rifles and telescope sights.

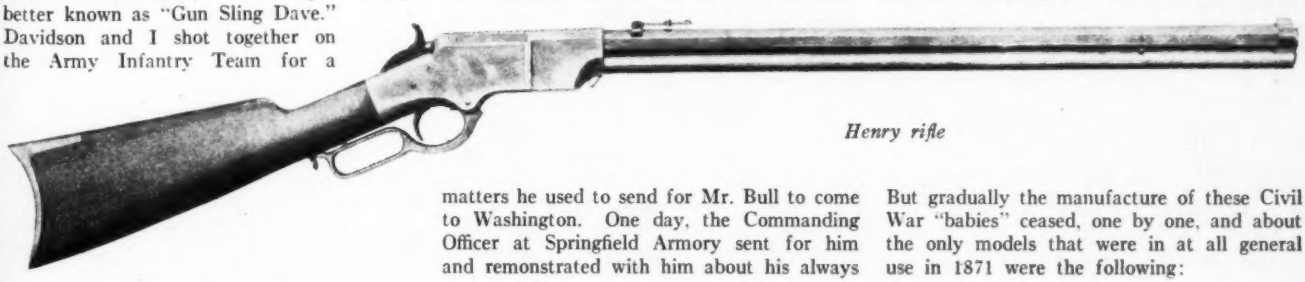
Mr. Bull was a great character, and many stories are told about him. He knew more about Springfield Armory and rifles than anyone else in those days, and when the Chief of Ordnance wanted information on these matters he used to send for Mr. Bull to come to Washington. One day, the Commanding Officer at Springfield Armory sent for him and remonstrated with him about his always using Pullman accommodations when he went to Washington, and Mr. Bull replied: "Well, Colonel, just because my name's Bull, you need not think I am going to ride in a cattle car."

During the period that our troops used the .45-70 Springfield rifle—from 1873 to about 1894 in the Regular Army, and until about 1902 in the National Guard and by civilians—a number of slight changes were made in the rifle, and Models of 1873, 1877, 1879, 1880, and 1884 were put out. Many of the older rifles also had these modifications added to them, so that today it is possible to find an early model embodying the features of a much later model. The first rear sight was quite crude, similar in most respects to that on the Model of 1870. In 1879, a buck-horn sight having windage adjustment was added. In 1884 the famous "Buffington" rear sight was adopted, having both a peep sight and the windage adjustment, and thereafter that sight was preferred by everyone. In 1884 also, a rod bayonet was substituted for the old ramrod, about half the rifles in use when this rifle was superseded by the Krag being equipped with this rod bayonet.

RIFLES OTHER THAN ARMY

In 1871 most of our target-shooters still used percussion-lock muzzle-loading rifles. A number of local gunsmiths were still making such rifles, and some of these were equipped with false muzzles for accurately seating the bullet. These false-muzzle rifles shot with most remarkable accuracy, and would frequently place 10 consecutive shots in a 3-inch circle, and occasionally closer, at 200 yards. Most of these were very heavy pieces, and many of them were equipped with telescope sights.

The little .22-caliber rifles had practically not yet appeared, but some few light rifles were being made for the .32 rim-fire cartridge. But as a rule, all rifles were either military rifles, or were intended for big game and for Indian warfare. During the Civil War many manufacturers produced the various models which had been presented to military boards, and after the war they endeavored to market these rifles among hunters and frontiersmen, with more or less success.



Henry rifle

But gradually the manufacture of these Civil War "babies" ceased, one by one, and about the only models that were in at all general use in 1871 were the following:

The Remington Rifle.—The Remington rifle with the well-known Rider action was adopted by the United States Navy as its service rifle in 1868. It used the same .50-70 cartridge as the Springfield rifle, Model of 1868-1870. We always think of the Remington rifle as being made by the Remington Arms Co., but as a matter of fact, the first 10,000 of these rifles for the Navy were made at Springfield Armory. The Remington rifle, also in .50-70 caliber, was adopted by the State of New York for its National Guard in November, 1871, and was used by that State for a number of years—almost, I think, up to the Spanish-American War. A little later, the Remington Arms Co. produced some of these rifles of target type, with pistol grip stocks and long-range vernier peep sights on the heel of the stock, to use the Sharps long-range cartridges, and a number of prominent riflemen used these rifles in long-range target practice. Today .50-70 Remington rifles in good condition can still be purchased from Francis Bannerman Sons.

The Spencer Repeating Rifle.—This rifle was patented in 1860. Over 100,000 of them were purchased and used extensively during the Civil War, and they were perhaps the most popular and satisfactory of all the breech-loaders used in that war. Afterwards, the rifle became very popular on the Western frontier. Many of them were used by settlers and frontiersmen, and some were also traded to the Indians. However, when the Winchester Repeating Arms Co. brought out their Model 1866 rifle made on the Henry patents, this rifle soon replaced the Spencer. The Spencer was made to take a .56-caliber rim-fire cartridge.

The Sharps Rifle.—The Sharps rifle was manufactured by the Sharps Rifle Manufacturing Co. at Hartford, Conn., from 1851 to 1875. The first Sharps, with falling breech block and outside hammer, used a cartridge in which the powder charge in rear of the bullet was inclosed in a paper envelope. The nipple on the breech block was primed with a percussion cap the same as a muzzle-loader, but in later models, the rifle was provided with a primer magazine containing a number of primers on a tape. Cocking the hammer presented a new primer to the nipple. Many thousands of these rifles were purchased and used during the Civil War.

Some time about 1870 the Sharps rifle was adapted to use the .50-70 center-fire cartridge, and it is thought that this was the first center-fire Sharps. Some time later, probably about 1873, Sharps brought out rifles to shoot their famous series of center-fire cartridges, from the .40-50 to the .45-120-550. The latter cartridge, containing 120 grains of black powder and a 550-grain paper-patched lead bullet, became famous as a long-range target cartridge. In fact, from its introduction until the Spanish-American War, the .45-120-550 Sharps long-range target rifle was the favorite weapon for use at 800, 900, and 1,000 yards, and was the choice of almost all long-range riflemen of that period. The rifle had a vernier rear sight set on the heel of the stock, and was almost always shot in the back position. It was necessary to clean the rifle after each shot to obtain the finest long-range accuracy. From five to ten men fired on a single target. After a man had fired a shot, he got up, took a Fisher brush out of a can of water by his side, and pushed it through the bore of his rifle from breech to muzzle. The Fisher brush consisted of a hog-bristle brush with a series of rubber washers behind it. The wet brush loosened all the black-powder fouling, and the rubber washers pushed all fouling and water out of the bore, leaving it clean and dry. As anywhere from 5 to 10 minutes intervened between the shots of a competitor, and as the wind conditions were liable to change completely during that interval, a long-range rifleman of half a century ago had to be a past master at the art of wind-doping. These long-range Sharps rifles were exceedingly accurate and reliable, and the scores obtained with them at long range compare very favorably with those made with the Springfield rifle of today.

About 1876 the Sharps Borchardt hammerless action superseded the outside hammer action, and many of these, also in .45-120-550 caliber, were used by our long-range riflemen.

Sharps also made a large number of sporting rifles for its series of center-fire cartridges, and many of these found their way to the Western frontier during the days of the buffalo hunters, one indeed being known as the "Buffalo Sharps." After the Civil War, first the Spencer rifle and then the Sharps and Henry rifles, were the predominant rifles of the West, and these in turn were finally driven out by the Winchesters of 1866, 1873, and 1876.

Ballard Rifle.—The Ballard rifle was invented in 1861, and a large number of these shooting a .56-caliber rim-fire cartridge were purchased and used in the Civil War. It is thought that in 1871 about the only Ballards in general use were those of that caliber. But about 1871 the Marlin Firearms Co. started to make these rifles, and they were brought out in center-fire calibers. A number were produced for large cartridges, but the action did not prove strong enough for these, and comparatively few Ballards of .40 and .45 caliber were made. In .38-55 and .32-40 caliber, the Ballard rifles became easily the most popular weapons among our target-shooters for use up to 200 yards; and they particularly, and the Sharps, Remington Hepburn, and Winchester single-shot rifles gradually supplanted the muzzle-loaders for fine target-shooting at short range.

Winchester Repeating Rifles, Models 1866 and 1873.—In 1860 Mr. Tyler Henry invented a repeating rifle operated by a trigger guard lever, with tubular magazine under the barrel. A large number of these were purchased and used by Federal troops during the Civil War. The company manufacturing this rifle was purchased and absorbed by the Winchester Repeating Arms Co. in 1866, and that company at once produced an improved Henry rifle which they named the Winchester Model 1866. The chief improvement consisted of constructing the magazine to load through a gate in the right side of the receiver instead of from the forward end of the magazine tube.

The Model 1866 rifle used a .44 Henry flat rim-fire cartridge. It became very popular throughout the United States, and had a large sale. Later this rifle was still further improved and strengthened, and was adapted to the .44-40 W. C. F. and .38-40 W. C. F. center-fire cartridges. The newer model was called the Winchester repeating rifle, Model 1873, and it became easily the most popular hunting rifle made, and more of them were sold than of any other rifle up until 1892, when a newer and improved model for the same cartridge superseded it. The .44 and .38 cartridges did not have sufficient power for game larger than deer, and so in 1876 the Winchester Company produced another rifle, known as the Model 1876, or Centennial Model, with the same Henry design of breech action to use much heavier .40- and .45-caliber center-fire cartridges for use on larger Western game. These Winchester rifles were essentially hunting rifles, and they were used very little for target-shooting. They are mentioned because of their great popularity in their day.

CARTRIDGES

The following advertisement of the Union Metallic Cartridge Co., published in 1872, gives a complete list of all metallic cartridges manufactured at that time, and lists the rifles in which they were used. More than any other exhibit, it shows, when compared with ammunition catalogues of today, the wonderful strides that have taken place in rifles and ammunition since the birth of the National Rifle Association. There is not a single cartridge or rifle on this list that is not obsolete, and completely outclassed by modern cartridges:

"METALLIC AMMUNITION

Manufactured by

THE UNION METALLIC CARTRIDGE COMPANY
of Bridgeport, Ct.

No. 22.—Adapted to Smith & Wesson's No. 1, Rollin White, Sharp's No. 1, Rupertus' eight-shot, Elliott's five-shot, Ladies' Companion, and single-shot Pistols and Rifles.

No. 22 Long.—Adapted to Standard Pistol.

No. 25.—Adapted to Bacon's and Bliss' Revolvers.

No. 30.—Adapted to Sharp's No. 2, and single-shot Pistols.

No. 32 Short.—Adapted to Smith & Wesson's No. 1½, Sharp's No. 3, Starr's No. 2, Elliot's four-shot and F. Wesson's and Allen's single-shot pistols.

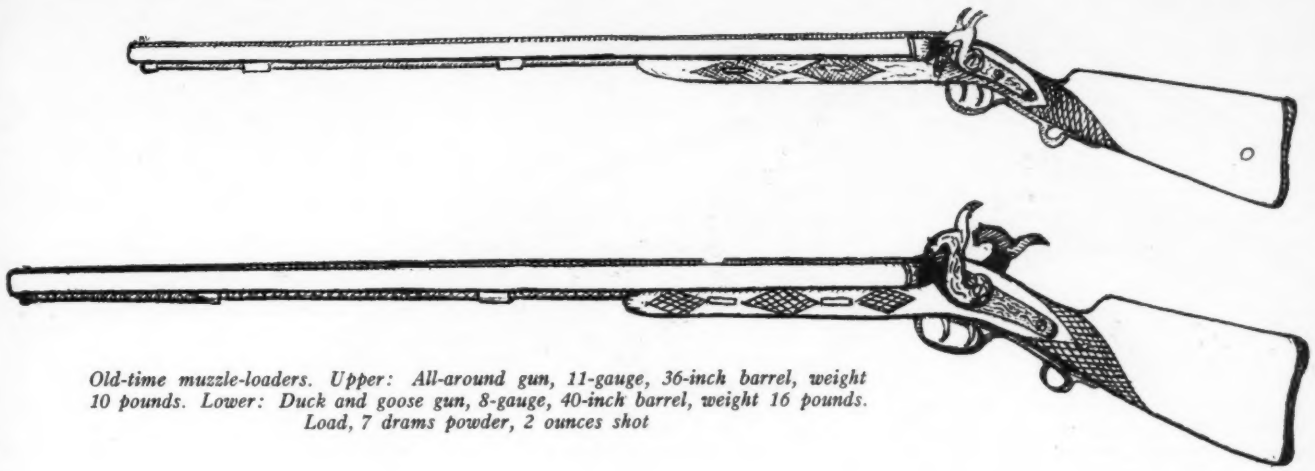
No. 32 Long.—Adapted to Smith & Wesson's No. 2, Pond's No. 2, Single-shot Pistols and F. Wesson's and Ballard's Rifles.

No. 38 Short.—Adapted to Wesson's and Ballard's Rifles.

No. 38 Long.—Adapted to Ballard's, Wesson's, and E. Allen & Co.'s Rifles.

No. 41.—Adapted to National, Derringer, and the Williamson's Pistol.

(Continued on page 48)



Old-time muzzle-loaders. Upper: All-around gun, 11-gauge, 36-inch barrel, weight 10 pounds. Lower: Duck and goose gun, 8-gauge, 40-inch barrel, weight 16 pounds. Load, 7 drams powder, 2 ounces shot

Game and Guns of 1871

By CHAS. ASKINS

THE first thing in order when describing the small-game shooting conditions of sixty years ago, will be to tell something about the guns in common use at that time. My earliest recollections, which, however, do not go back quite that far, were of the muzzle-loader. I lived in Illinois in the duck country, where about one farmer in five, no less the village residents, became market hunters as soon as the fall crops were in the ground. On one side of me, about 6 miles away, was the Mississippi River, with duck lakes as far north and as far south as anybody had knowledge of. On the other side of me was the Okaw River, a great resort for mallards and greenwing teal. To the north, three days' drive with a mule team, was the Illinois River, the most noted duck country in the United States at that time. The Mississippi overflowed periodically, cutting channels on the Illinois side, leaving a string of duck lakes, one after another, many of them as wide as the river itself and miles long, all the way from the mouth of the Illinois River to Cairo. I have seen times in the spring of the year when day after day flocks of ducks, geese, brant, pelicans, and swans were always in sight. No matter what time of the day you stepped out of doors, a flock of waterfowl could be seen, and maybe a hundred flocks. I have stood in a field, back of a rail fence, and shot arrows up among the passing ducks for hours at a time, coming mighty close but never hitting any.

Any man who could shoot ducks or who liked to shoot became a market gunner as a matter of course. Along in the fall, about the middle of October, the mule team would be hitched to the wagon, and duck boat loaded in, filled with homemade decoys, the feed box for the mules would be attached to the back end, the grub box fitted into place, and grain sacked for the team. They had to have a good wall tent, and rubber boots were a certain part of the outfit, with a 25-pound keg of the favorite black powder and 100 pounds of shot, usually No. 3 shot. Then, with plenty of old clothes, a Dutch oven, and a small sheet-iron stove to warm the tent, the gunners were all fixed and drove away for the Illinois River, where shooting began. Along about the middle of November our hunters would come drifting back, with stories of immense bags of ducks on the Illinois, of how much money they had made, of how this and that commission man had proved a dishonest scoundrel.

Usually they received $3 a dozen for mallards, canvasbacks, and redheads, down to 10 cents apiece for teal, and not much more for mixed ducks. On a good flight, therefore, it often happened that they refused to take any birds other than mallards, except for an odd flock of canvasbacks or redheads. From home the duck-shooters now drifted off south, to Fountain Bluff and Grand Tower, eventually fetching up in the New Madrid marshes, where they spent the remainder of the winter, coming home about the 1st of May. In those days Bogardus and the Kleinmans were shooting ducks on the Calumet marshes in the vicinity of Chicago. Kimble, Kelley, Long, and a thousand others shot on the Illinois River from Peoria south. St. Louis and vicinity turned out thousands of duck-shooting outfits, sending them in all directions, even up the Missouri River.

Nobody will ever be able to remotely estimate how many ducks were killed. One man told me that his bag for the season was 7,000. Long, in "Wildfowl Shooting," says that Kimble bagged over 1,700 ducks at one camp in three weeks. A good bag was 100 birds a day, and if these could all be mallards, that was considered a fine day's work. They didn't like to shoot much over 100 ducks a day, because those birds entailed a lot of work in drawing and packing, and getting them off to market. However, one man was reported to have killed 320 ducks in one day on Creve Coeur Lake, near St. Louis. He was a sportsman and not a market shooter.

Now we are coming to the guns. Nearly all of these were muzzle-loaders, in the '70's. The gauges ran from a 12 down to a 4. Not many 12's were in use, but 11- and 9-bores were common. Nine out of ten of these guns had long barrels, from 36 to 48 inches. Occasionally a man tried to see how long a gun he could procure, but, on the other hand, some one might prefer a gun with barrels no more than 30 inches long. This man was considered a crank whose example was not to be followed. The 4-bores probably were not common—I never saw one—but Fred Kimble speaks of shooting a duck match with a man named Rapp, who used a double 4-bore, while Kimble's gun was a 6-gauge single-muzzle loader. Eight-9- and 10-bores were preferred where the shooting was strictly for wildfowl. On the other hand, there were lighter arms, intended for all-around use, just as we have such guns today. The only muzzle-loader that I ever owned myself, though, was a 16, weighing no more than 7 pounds, with 32-inch barrels, for which my father traded a barrel of cider to a saloon-keeper, when we boys got old enough to want to shoot a shotgun. I put the same load in that little gun that others shot in big pieces, usually an ounce and a quarter of shot.

I am illustrating a couple of those old-timers, after going to a good deal of trouble to find them. The smaller gun is 11-gauge, 36-inch barrels, weight 10 pounds—a common gun on farms for general shooting. This gun is said to be about 75 years old. The second and larger gun was intended exclusively for ducks, though the grandfather of the man who loaned it to me maintained he had often killed deer with it at 150 yards, using buckshot. This big gun is an 8-gauge, has barrels 40 inches long, and weighs 16 pounds. The arm is 6 inches around the grip, stock is 14½ inches long, drop at comb 2⅛ inches, at heel 4½ inches. The stock

The lifter-action Parker

is massive, with a butt plate 6 inches long. It has a strap beneath the grip, curved to take the place of a pistol grip, both guns being alike in this respect. The pitch is about 10 inches down at the muzzle, and we may know from this old arm just why people came to prefer modern arms with plenty of drop, for they didn't have any other kind in the old days. These arms were not exceptional in length, but the old 8 is unusually heavy, such guns usually weighing about 14 pounds.

The loads in common use were not remarkably heavy, except as to powder charges, but every man was a law unto himself about the amount of shot he put in his gun. Some men were positive that no more than 1 ounce of shot was to be put in a 10-bore, while the next man would shoot 1½ ounces. Kimble used 1½ ounces of shot in his 6-bore, but the 8-gauges were often loaded with 2 ounces. Economy cut some figure among the market shooters, for they didn't want to waste shot where the birds came in close. The ounce and a quarter was probably the most common charge, with anywhere from 4 to 7 drams of powder. When shooting was hard, ranges, long, more powder would be placed in the gun. Now I am going to quote from Joe Long's "Wildfowl Shooting," the best authority we have, published at this particular time. That book was, I believe, first published in 1874, being revised in 1879 for a second edition. Mr. Long says:

"I suppose I may say a few words on the comparative merits of the breech- and muzzle-loaders, for to my mind, notwithstanding I am willing to acknowledge the general superiority of the new invention, the muzzle-loader possesses several decided advantages which entitle it to merit and in certain cases to preference in selecting the most suitable weapon.

"The chief superiority of the breech-loader lies in its capacity for being so quickly reloaded when in the field or boat, and this alone is a sufficient advantage to compensate for many otherwise serious objections; for, no matter how smart a man may be with a muzzle-loader, he will often lose many opportunities of shooting through not being ready loaded, while to the patron of the breech-loader such occurrences are very rare, provided he has plenty of loaded cartridges handy. This one requirement, however, being often wanting, the advantage is not so conclusive. The providing or reloading of a sufficient number of metallic shells or the transportation and room required for their paper substitutes, is the most serious drawback in their use; and here it is that the claim of the muzzle-loader is especially noticeable. This conclusion was not formed hastily, but was brought to my mind very forcibly, though rather unwillingly and most frequently when sitting up at night loading shells and listening to the snoring of my fellow hunters, votaries of the muzzle-loader, who, having eaten supper, washed their guns, and refilled their pouches and flasks, had rolled up in their blankets to 'woo tired nature's sweet restorer.'

"On pleasant days, when shooting from my boat, I usually made a practice of reloading as fast as possible between shots, carrying an ammunition box and loading tools with me for the purpose; but this, for obvious reasons, I could not well do on very stormy days or when shooting away from my boat, and, consequently had to refill my shells at night, often when I should have been sleeping, or else forego my morning's shoot the next day.

"Frequently in spring continuous shooting may be had at travelers, as they are termed by hunters, ducks making long flights, often migrating, flying high in the air, offering few shots under 50 yards and and more over 60. This kind of shooting requires a good gun and heavy loading, lots of powder and large shot, if procurable—so much powder, 5 or 6 drams, that it would be folly to make a practice of so large an amount in ordinary shooting. Consequently, the shells being usually loaded with common charges, this sport must be given up or the shells emptied and reloaded more heavily, a tedious job when ducks are flying thickly. With a muzzle-loader all one needs to do is to raise his charge a notch or two and he is ready to kill his farthest. Again, on the other hand, very close shooting may often be had when available ammunition is not very plentiful. It is then, of course, desirable to lessen our charge as much as possible in order to receive the greatest benefit from our opportunities. And here, again, the muzzle-loader has the preference.

"To be brief, a man risks fewer long, wild shots with a muzzle-loader, and consequently wastes less ammunition and has less extra bulk and weight to carry, as shells, loading tools, etc.; and in boat shooting, if he carries two muzzle-loaders, can, I think, kill more game the season through than with one breech-loader, as he will frequently have an opportunity to shoot both guns into the same flock of ducks before they get out of reach. I shall describe hereafter a method of loading a muzzle-loader in which the operation is greatly shortened and much valuable time saved.

"Now, to sum it all up, in my opinion, for the majority of uses, the breech-loader is the superior weapon for the novice or the gentleman sportsman. For the poor market duck-hunter, if he can afford but one gun, I would advocate the muzzle-loader. He will find it much less trouble to take care of and less work to keep loaded: he may kill a few more ducks with the breech-loader, but they will cost him enough more to make up the difference. For boat shooting I would advise, when it can be afforded, the use of both guns, when either may be used as occasion demands, and the special advantages of each secured.

"We will suppose our reader to have made up his mind which class of guns suits him best, breech- or muzzle-loader. Next to dimensions. For flight shooting an 8-bore is as large as is advantageous, and a 10 is small enough. For a breech-loader I should not use larger than a 10, as the cartridges for an 8-gauge are too bulky and require too much room in transportation, and the 10 if properly loaded will kill nearly as far. For a muzzle-loader an increase in the gauge will admit of large charges being used for flock shooting, while the special objections to the large-bore breech-loader, as bulk of shells, does not apply. The weights in proportion to gauges should be as follows: For a 10-bore, 9 to 10½ pounds;

9-bore, 10½ to 12 pounds; 8-bore, 12 to 14 pounds. Barrels should not be over 35 inches except in 8-gauge."

It is to be seen that this was a time (from 1870 to 1875) of transition from the muzzle-loader to the breech-loader, and many were reluctant to part with their old favorites. Fred Kimble had invented choke-boring in 1868, and the muzzle-loaders were being choked. Kimble's old 6-gauge muzzle-loader was supposed to be the closest shooting gun in existence, and no breech-loader ever was made that would keep all shot in a 30-inch circle at 40 yards, which the 6-bore would do. Western gunsmiths learned how to choke guns before the gun factories did, and the rebored muzzle-loaders uniformly outshot the breech-loaders. It is to be noted that Long speaks of shooting "travelers," rarely to be taken under 50 yards and most likely over 60. Our popular 12-bore guns are not reliable beyond 60 yards today. Then just about everybody used brass shells, which they loaded themselves, and these cases were heavy, twenty-five making a pocketful. Moreover, the wad confining the shot was liable to loosen, with the shells pounding one another in the pocket, so jackets had to be bought, in which the shells were placed in rows, every one to itself. Later some thinner brass cases were designed, which could be crimped with the fingers, and that helped.

I suppose that from the time market shooting began in the West, about 1850, until it ended around 1890, the bulk of the waterfowl were killed with muzzle-loaders. Joe Long speaks of having killed 75 ducks from a half hour before sunset until dark, and he says he'd have killed a lot more with a breech-loader. However, the cost of ammunition had to be balanced against the returns for the birds, and it certainly was cheaper to shoot the muzzle-loader. The breech-loader then was not what it should have been, either. Our teacher, a man of shooting inclinations, bought one in the early '70's. It was a Lafeucheux, made in Belgium, costing $15. Some of the older boys got him to target it at the side of a house, 12 feet across, and they afterwards declared that it scattered clean across the building, from a distance of 40 yards. They noted, too, that he couldn't shoot a rabbit's head off at 20 feet, while a muzzle-loader wouldn't leave a sign of that head. Matter of fact, the muzzle-loading shotgun never went out until smokeless powders came in, and then brass cases for the breech-loader went at the same time, and for a like reason. Smokeless powder never did work in a muzzle-loading gun, because the caps were not strong enough to burn the powder, nor were the primers used in brass shells.

It took the factories a long time to perfect breech-loading cartridges. I tried American "Wood powder," and it wouldn't shoot worth a whoop unless I put a half dram of fine black powder under it; this in paper cases. A friend of mine got hold of some Schultze powder and loaded a hundred Winchester cases for me. I was going snipe-shooting in the spring of the year, out on the Missouri River near St. Charles. It was known that I could kill snipe if I couldn't kill anything else. On a great, flat natural meadow, grass 3 to 6 inches high, with shallow pools of water all over it, the snipe were thick. They sprang in front of the shooter and to either side, rising from right at a man's feet to 30 yards distant, "scaiping" away gently, winging anywhere from 50 to 200 yards, and then dropping back in—maybe a dozen snipe on the wing constantly—all very like wading through a clover field full of grasshoppers, jumping up and going down, jumping up and going down. I fired my hundred shells in about three hours, and killed eighteen snipe. The loads squibbed, fizzled, hung fire, and only an occasional shell would kill a bird, and he had to be mighty close. Smokeless powders had to wait for smokeless primers, which came by and by.

The muzzle-loaders deserve full mention when considering the duck and field guns of 1871, and no doubt the reader will think they have been given it. No better shooting guns have been made to this day than the choke-bored muzzle-loaders of 10- to 6-gauge; and, so far as shotguns are concerned, nothing stronger shooting than good black powder has been made, either. Kimble and others talk of killing single ducks regularly up to 80 yards, black powder and muzzle-loading guns, and no breech-loader made in America will do it, though a Greener 8-gauge would, gun weighing 14 pounds, loaded with 2½ ounces of shot.

Now we are going to breech-loaders, for these were made in the '70's. A queer thing about the change was that while muzzle-loaders were generally made with straight grips, breech-loaders came in with pistol or half-pistol grips. Various factories began building breech-loading shotguns in the '70's, possibly earlier. I am giving a drawing of one of the early Parkers. This is a lifter-action, and was a favorite among duck-shooters, the market hunter no less than the gentleman sportsman. The Greener, Westley Richards, and Scott were also popular among the imported arms. The Parkers advertised their gun as the "best shotgun in the world," as possibly it was. Duck-shooters used it mostly in 10- and 8-gauges. Even the chicken- and quail-shooters used the 10-bore, in a weight of 9 to 10 pounds. It took trap shooting and a hammerless gun to develop the 12-gauge, and we will have little to say about hammerless guns. They were made in Europe in 1875, but not that early in this country.

"Uncle Dan" Lefever, a cut of whose gun we are showing in an early model, was a gun-making genius. His gun is called the first American hammerless, but is really, as shown, a semihammerless, cocking with a lever at the side. From the time he started in until old age stopped him, Lefever never was satisfied with anything he made, apparently, but kept changing his guns from year to year. He invariably made handsome guns at that, racy in outline, and shooting with the best. I can remember the arguments which held that the Lefever semi-hammerless was superior to any straight hammerless, in that far less mechanism was required to do the cocking.

Just the opposite of Lefever, when the Parkers made anything they considered it right and wouldn't change it. The Parker gun illustrated remained just so for many a year, the only change being that the bolt was arranged to be withdrawn by a top lever instead of the "lifter." Next to the muzzle-loader, I have little doubt that the Parker killed more game than any other gun. A good Parker could be had for from $50 to $100, while an imported gun of equally good make would cost three times as much. Only the man of means could afford a Greener; but the market shooter could afford to buy a Parker, and he did. The Parker of fifty years ago shot as well as a Parker or any other gun does today, in my opinion, though it had outside hammers and the barrels were made of Damascus or twist steel instead of fluid compressed steel.

(Continued on page 30)

Lefever "hammerless" gun

EDWARD J. MANNING.....

GEORGE BERGMAN

IN METROPOLITAN RIFLE LEAGUE INDOOR MATCHES

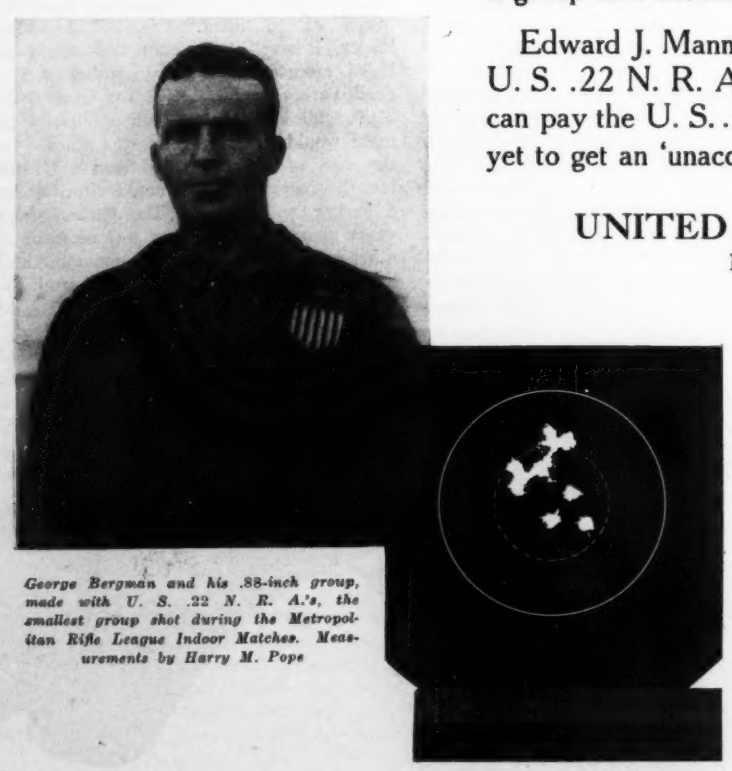
U. S. .22 N. R. A's scored on something more than the targets in the Metropolitan Rifle League Indoor Matches. They scored on shooters' opinions . . . . established themselves more firmly than ever in shooters' minds as cartridges that represent unvarying high standards of accuracy . . . cartridges upon which shooters can depend.

With Edward J. Manning behind them, U. S. .22 N. R. A's tied the high score of 499 x 500.

With George Bergman at the trigger, they registered the smallest group of the entire shoot . . . ten shots at one hundred yards in a group that measured only eighty-eight one-hundredths of an inch.

Edward J. Manning expressed the knowing shooters' opinion of U. S. .22 N. R. A's when he said, "The greatest compliment I can pay the U. S. .22 N. R. A's is that while using them I have yet to get an 'unaccountable'".

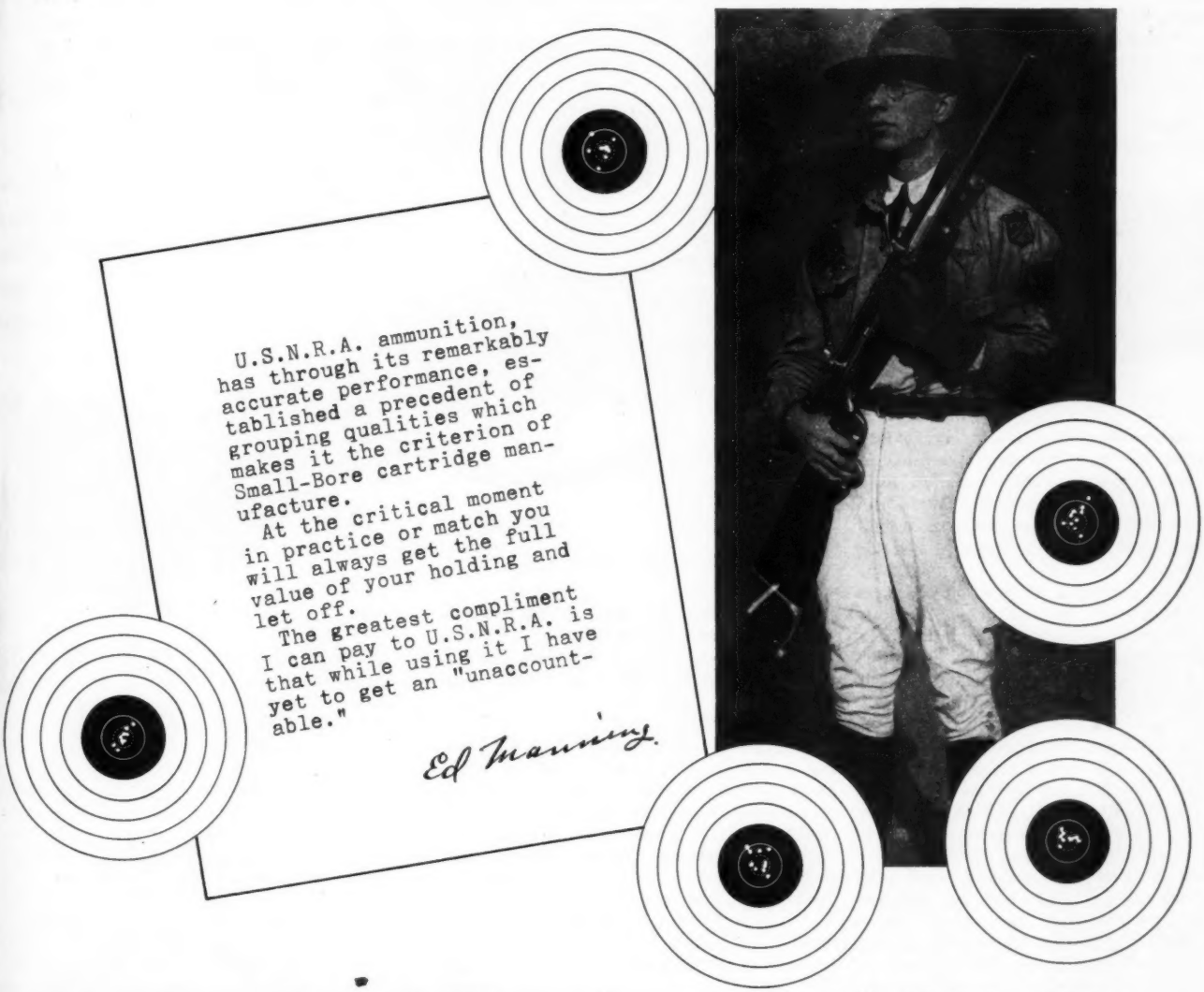
UNITED STATES CARTRIDGE CO.
111 Broadway, New York



George Bergman and his .88-inch group, made with U. S. .22 N. R. A.'s, the smallest group shot during the Metropolitan Rifle League Indoor Matches. Measurements by Harry M. Pope

US

scores 499 x 500
shoots SMALLEST GROUP


U.S.N.R.A. ammunition, has through its remarkably accurate performance, established a precedent of grouping qualities which makes it the criterion of Small-Bore cartridge manufacture.
At the critical moment in practice or match you will always get the full value of your holding and let off.
The greatest compliment I can pay to U.S.N.R.A. is that while using it I have yet to get an "unaccountable."
Ed Manning.

Edward J. Manning and the five targets on which he scored 499 x 500 with U. S. .22 N. R. A.'s. Read Mr. Manning's illuminating letter concerning the shooting qualities of these popular small-bore cartridges

.22 N.R.A.
Long-Rifle Cartridges

GAME AND GUNS OF 1871

(Continued from page 27)

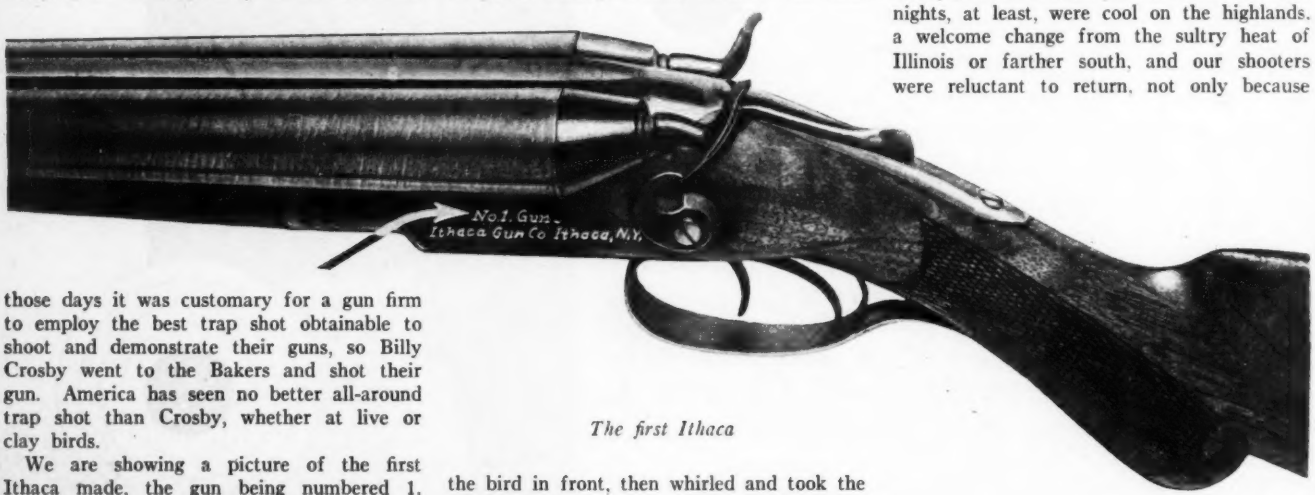
Following hard after the Parker came the Ithaca, Baker, and Smith guns. L. C. Smith, who originated the Smith gun, and for whom it was named, was the uncle of the present L. P. Smith, of the Ithaca Gun Co., so this is a gun-making family. The Smith Gun Co. developed the rotary cross bolt, the only original contribution to American shotgun building. The cross-bolted Smith was guaranteed to remain tight and sound forever, so that the man who had one was no more able to shoot it loose than he could shoot a muzzle-loader loose. In addition, the Smith had a reputation for long range and hard hitting. A lot of duck and trap shooting was done with the old Smith 10-bore hammer gun.

The Baker, too, was well liked, though that company made a specialty of 12-bores. In those days it was customary for a gun firm to employ the best trap shot obtainable to shoot and demonstrate their guns, so Billy Crosby went to the Bakers and shot their gun. America has seen no better all-around trap shot than Crosby, whether at live or clay birds.

We are showing a picture of the first Ithaca made, the gun being numbered 1. That gun was made in 1880, and is still in use. The Ithaca hammer gun could be bought for less money than the others, was widely sold, and probably did more to put muzzle-loaders out of business than any other arm. It was a strong and simple gun, always ready for business, and it was the one gun that importers of Belgian and German arms found it hard to compete with. The Ithaca Gun Co. now has one of the greatest shotgun plants in the entire world.

In the '70's men had personal convictions concerning which was the best gun, and the sporting press was filled with articles, sometimes logical, sometimes contentious, as to the merits of the Parker, the Lefever, or the Greener. Among the Parker backers was Capt. A. W. Du Bray, a man who had been an officer in the English Army. He preferred the Parker to any gun made in his home country, and he never failed to say so. Captain Du Bray died recently. He was a good friend of mine and I have several letters from him, written on his death bed.

Perhaps the best wing shots that America ever produced were those who had begun with the muzzle-loader and ended with the breech-loader. They had an opportunity to develop shooting skill that we will never have again, except at clay birds. Most of these men were market hunters, and when game selling was legislated out of existence or went out because of scarcity of game, our market hunters took up trap shooting, both at live birds and clays, as a profession. Among these men were Budd, Stice, Fulford, Grimm, Heikes, Bogardus, Carver, Crosby and many others. The live birds were in the beginning, passenger pigeons that had been trapped. Followed clay birds, and always along with them, live-bird matches. With all due respect to our present highly skilled trap shots, not a great deal of improvement in trap shooting has been made in the last fifty years. In the old days men had to learn to shoot with gun down, butt beneath the elbow, which should be the manner of holding a gun to this day. Shooting in this style, I saw Bogardus break fifty clay birds straight, birds being thrown in pairs, one trap located 16 yards directly in front of the shooter; one 16 yards directly in back of him. He took the bird in front, then whirled and took the one back of him, not seeming to have any trouble in getting both. We had a great company of professional trap shots in the '80's, and we have some yet, but not so many.



The first Ithaca

Men have a great tendency to follow a lead. In England, grouse-shooting began about the 1st of August, as duck-shooting does now in the north of Europe. Much literature on shooting came from England, and if they began grouse- and duck-shooting over there on the 1st of August, so would we. Duck- and chicken-shooting, therefore, began August 1, all over the great Northwestern prairies.

From the Mississippi River west to the Rocky Mountains, as far north as the Canada line, in an area embracing Iowa, northern Wisconsin, Minnesota, and the Dakotas, taking in the whole of Nebraska and most of Kansas, a scope of country perhaps 800 miles square, there were millions of prairie chickens. Nobody believed that their numbers would ever be lessened, if anyone thought of that at all. Along with the chickens there were ducks, all kinds of ducks, which bred on the prairies. Ducks hatched anywhere from the Texas Panhandle north to beyond the ken of man, and very likely all the way from the Gulf of Mexico to the arctic regions. Hence our August hunter found all kinds of grouse to shoot, and so many ducks that he didn't know what to do with them, so had to limit his killing.

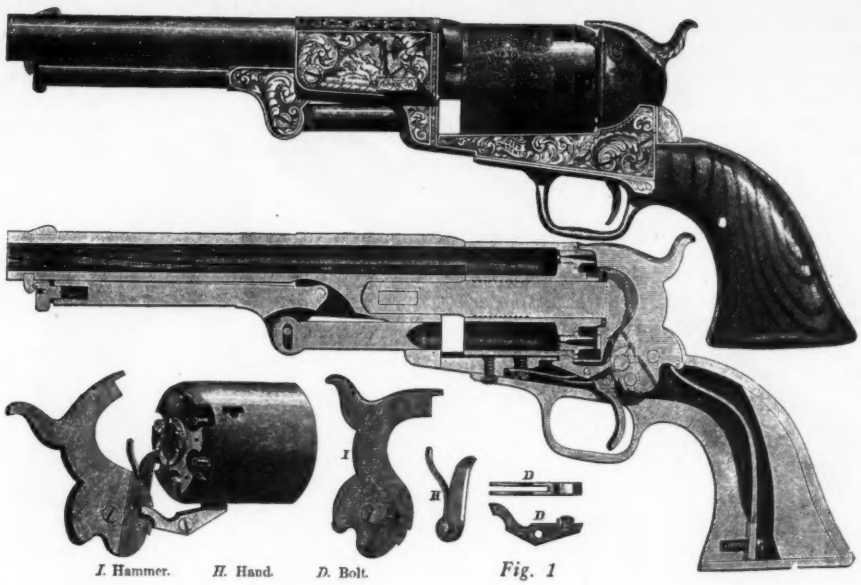
The common plan of warfare was to go north to any railroad town, and there outfit for a campaign. One needed a team and a wagon and a driver, unless the party was large enough so that the shooters could take turns at driving. The trip might embrace a circuit of 300 miles, across the open prairies, the party shooting wherever they liked, stopping at any little town where night overtook them. The wagon carried a crate of dogs, a tent, and two or three cases of ammunition. Occasionally some of the game was shipped home, or in an earlier day some of it was sent to market. Not much of that was done because the weather was too warm to keep the birds.

Some of these prairie hunters stayed a week, some two weeks, some a month. The nights, at least, were cool on the highlands, a welcome change from the sultry heat of Illinois or farther south, and our shooters were reluctant to return, not only because of the game, but because of the blessed tonic of frost in the air.

How many men migrated to the Western prairies for the August shooting? Lord, we will never know! In the '80's, I never knew a village so small that it hadn't sent somebody to Iowa or Minnesota or the Dakotas for chicken shooting. "Rich man, poor man, beggar man, thief: lawyer, doctor, merchant, chief"—they all went except the poor man, who eventually went there to live, taking up a claim. By the way, the man of the claim shanty was the chap who eventually killed off the game, for he was there all the year and he shot all the year. He needed the ducks and the chickens to eat, and he ate them or sold them. Every man could kill all the chickens or all the ducks on his own farm, and when every quarter section became occupied, that was the end of the chickens and the ducks, except those that bred beyond his reach. The thirty years, between 1870 and 1900, marked the virtual end of chicken-shooting. Here and there a few chickens remain to this day, mostly in the Nebraska sand-hill country, where the land is not adapted to agriculture.

It was said that we had a million buffalo in 1870. None remain that we are allowed

(Continued on page 47)



I. Hammer. *H.* Hand. *D.* Bolt. *Fig. 1*

Pistol Progress—1871

By MAJ. J. S. HATCHER

IF WE COULD turn back the clock sixty years to the birthday of the National Rifle Association, we would find that pistol-shooting as a sport was entirely unknown. It was not until 1880 or thereabouts that Chevalier Ira A. Paine brought pistol-shooting as an accomplishment prominently before the eyes of the world.

The N. R. A. was born just six years after the close of the Civil War. Cartridge weapons of all calibers were coming into prominence, but the old cap-and-ball gun was still widely used. If the writer of this article had been living back in the year 1871, and had undertaken at that time to write about the development of handguns in 1871, he would probably have written about as follows:

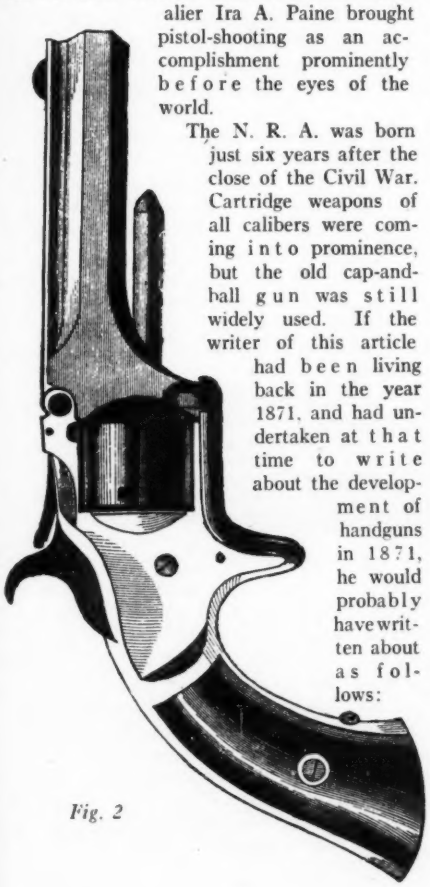


Fig. 2

Though the Colt revolver is now thirty-five years old, it still retains an enviable position as one of the outstanding firearms of this period. As is well known, this gun was invented by Samuel Colt, and patented in 1836. After a most careful test of this arm by the United States Government, an order was given to Colonel Colt for 1,000 pistols, and this order furnished him with sufficient capital to establish the well-known Colt Armory at Hartford, Conn., which has since become world-renowned.

During the period from January 1, 1856, to the close of the Civil War, 554,283 pistols were manufactured at this plant. All of the Colt pistols are made on the general plan shown in Fig. 1. Among the most popular are the Colt Navy Pistol, .36 caliber, and the Colt New Model Pocket Pistol, .31 caliber.

Both of these excellent weapons use powder and ball instead of the metallic cartridges which have become so popular lately for rifle use, for the makers of this arm claim that the use of powder and ball has an advantage in that cartridges are not always to be obtained, whereas powder and lead are always found in stock even at the most remote trading posts. The correctness of this view is indicated by the fact that the demand for these pistols is still very great. During the past year the sales reached the enormous number of 300,000.

It is said that the Colt firm has a very excellent cartridge revolver already designed, but the patent situation is such that it will be at least another year before this can be placed upon the market.

In 1855 Mr. Rollin White obtained a patent on a revolver in which the cylinders were bored clear through and left open at the rear end. This was for the purpose of loading the charge of powder and ball from the rear end of the cylinder, after which the cylinder was to be closed by means of a wad having a hole through the center. White's gun had a single nipple under the hammer upon which a cap was to be placed, which, on firing, would ignite the charge through the hole in the wad, above mentioned. This system was found to be totally impracticable for several reasons. For example, it necessitated the placing of a fresh cap each time the chamber was discharged; and, moreover, the fire from one chamber would tend to pass to the adjoining chambers through the holes in the wads, thus causing premature discharges.

For these reasons the patent was worthless for the purpose for which it

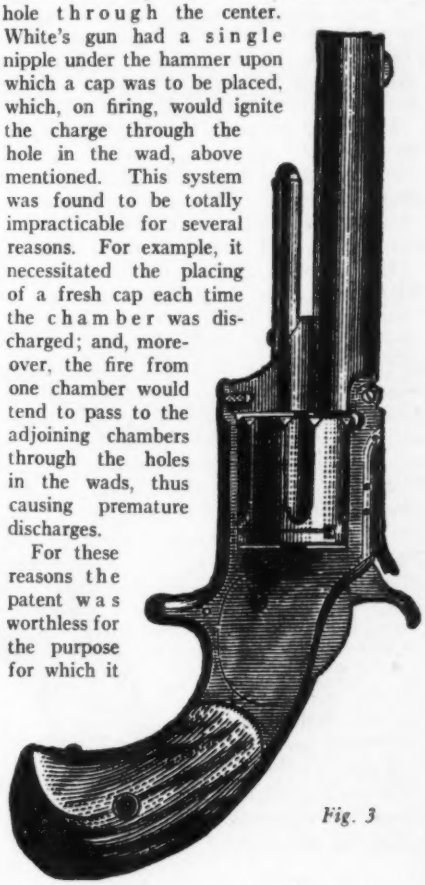


Fig. 3

was originally taken out, but the progressive firm of Smith & Wesson, located in Springfield, Mass., having on August 8, 1854, patented a metallic cartridge containing not only the requisite charge of powder but also a lubricated wad placed between the powder and the ball, conceived the idea that such a cartridge would be useful in revolvers. They also perceived that through the ownership of White's patent they could obtain a monopoly on revolvers so constructed as to enable them to be loaded with cartridges from the rear end of the cylinders. Accordingly, they acquired the White patent and are at the present time the only firm in this country who can manufacture a revolver with the cylinders bored all the way through from end to end.

The term of a patent being seventeen years, the White patent has one more year to run before it expires, at which time it is anticipated that quite a number of firms will come into the market with cartridge revolvers.

A revolver designed by Smith & Wesson was patented on July 5, 1859, and on December 18, 1860. Also on April 17, 1860, they obtained a patent on an improved rim-fire cartridge especially adapted to these revolvers.

The arm as introduced by Messrs. Smith & Wesson is represented by the illustration, Fig. 2, of which pattern two sizes are manufactured. The smaller size has seven chambers, and uses a cartridge of .22 caliber with conical bullet weighing 34 grains, and 3 grains of powder.

The larger size has a barrel 6 inches long, six chambers, and uses a cartridge of .32 caliber, weight of bullet 103 grains, with 13 grains of powder. This larger arm has the advantage of a more graceful style and appearance, as will be seen from the cut, Fig. 3.

These guns, as will be perceived in the two illustrations, have the barrel hinged to the top strap of the frame at the front end of the cylinder, and are locked to the lower limb of the frame by a spring latch which locks automatically when the barrel is swung down into position. The cylinder is mounted on a center stem secured rigidly at its rear end to the recoil shield or breech piece of the frame, and very loosely at its front end in the projection under the barrel, so that to remove the cylinder it is only necessary to unlock the barrel and swing it upward, when the cylinder can be slipped forward off of its stem. A rod is attached permanently to the front part underneath and parallel with the barrel, as shown in the illustration, by means of which the shells can be readily pushed out of the chambers after the cylinder is detached, thus avoiding the necessity of any separate rod or mechanical device for that purpose.

Fig. 4

Up to the beginning of the recent war between the States no revolver in which metallic cartridges were used had been adopted by the military authorities; yet the advantages of this new arm were so apparent that thousands of these revolvers were bought by officers in the Army and Navy, and so great was the call for them that orders were on the books of Messrs. Smith & Wesson for all their possible production for two years in advance.

The demand for these arms in the United States was such that up to four years ago Smith & Wesson made no effort to sell them abroad; but at the Paris Exposition in 1867 a case of their various models was exhibited, which at once attracted attention, and from that time a demand arose which has consistently increased, resulting in large shipments to Japan, China, England, Russia, France, Spain, Peru, Chili, Brazil, Cuba, and to almost every nation on the globe.

The revolver as above described was manufactured without alteration until a year or two past. Since then, however, other improvements have been added, resulting in the production of one far superior, especially for military purposes, to anything of the kind ever made before.

Fig. 5

The new arm is illustrated in Fig. 4. This gun, made in .44 caliber, has been recommended for use by the United States Cavalry, and it is also understood that Russia has determined to adopt this gun for its cavalry.

While the revolving pistols have a great advantage in their ability to shoot more than one shot without reloading, they by no means monopolize the field of hand firearms at present. The revolver has a very formidable rival in the Remington single-shot pistol, of which a number were furnished to the Navy in 1867, and which has recently been recommended for adoption in the Army. Five thousand of these pistols have already been ordered for Army use, and will be known as the Model 1871. This pistol is illustrated in Fig. 5.

Among the several recommendations of the United States Board of 1870 as published in Ordnance Memoranda No. 11 is a decision in favor of the single-shot, breech-loading pistol, of the Remington system, for cavalry. The above-mentioned Ordnance Memoranda states in part:

"Of the breech-loading pistols submitted, the board has selected the following six in the order of relative merit:

"(1) Remington single-barrel pistol, with guard, center-fire.

"(2) Smith & Wesson revolver * * *

"Pistols and revolvers should have the 'saw-handle' so shaped that in bringing the weapon from the holster to an aim, it will not be necessary to change the first grasp or bend of the wrist."

As will be seen in the illustration, the saw-handle as applied to the new model renders its handling exceedingly simple and easy, as it "brings up" in the most natural manner possible.

The length of barrel of the improved model —8 inches—and the admirably adapted degree of rifling twist, secure not only almost a carbine's range, but remarkable precision for this pistol. The exceeding ease with which it is loaded, and its natural grasp, make it also capable in practical hands of a rapidity of consecutive discharge per minute greater than that of any revolving or repeating arm. In addition to such shooting qualities and facility of handling, this gun, possessing as it does a caliber of .50, is beyond doubt the most formidable hand firearm known to any service, or as yet produced. The weight of the model of 1871 is but slightly over 2 pounds.

Forgotten Guns of the Early '70's

By PAUL B. JENKINS

Advisor on Arms, The Nunnemacher Collection, Milwaukee Public Museum

HERE are some curios for the gun-crank—which happen, however, to be not mere curios but actual historical facts from that stage in the evolution of firearms which had been reached at just about the time when the National Rifle Association of America was born. For convenience in presenting, a little farther on, the explanation of some of the seeming impossibilities recounted, I have numbered the arms mentioned.

Did you ever hear of a rifle which had neither grooves nor lands, the interior of whose bore was as smooth as glass, but which was yet so true a rifle, and so accurate, as to be capable of putting 10 consecutive bullets on an ordinary visiting card at 100 yards? (1.)

Did you ever hear of a rifle the interior of whose bore not only had neither grooves nor lands, but was not even *round!* yet which up to 1,200 yards' range outshot every competitor of its time? (2.)

Did you ever hear of a four-barreled hammerless gun—both shotguns and rifles—the barrels in superimposed pairs, the quartette hinged for the usual drop-down opening for loading; offering 4 shots in succession as fast as the trigger could be pulled; actuated by a revolving striker inside the lock which struck the firing pins of the barrels in turn, shotguns on this system being made in 12-, 16- and 20-gauges, and rifles in all calibers from .45 to .577? (3.)

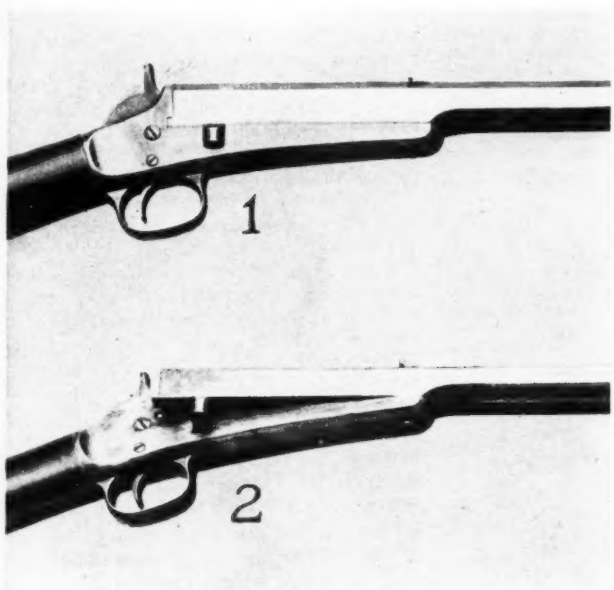
Did you ever hear of a *double-barreled bolt-action* shotgun, each barrel was its individual bolt and bolt handle, the two bolt handles standing out at right angles at either side of the breech actions; the fired shells dropped out through slots in the under side of the receiver? (4.)

Did you ever hear of a *hinge-less* drop-down double-barreled breech-loading shotgun, whose barrels, while tipping up for loading, had yet no fixed pivot or hingepin on which they turned in opening? (5.)

Would you believe, if anyone were to tell you, in the existence of such a thing as a double-barreled shotgun whose stationary barrels were permanently fixed in position against the breech face and were loaded or unloaded by opening each separate *lock plate*, hammer and all, outward, on a hinge at the forward end of each plate, exactly like a miniature door, and then shoving the cartridges in through these openings, *behind* the locks, and so on into the barrel chambers ahead of these? (6.)

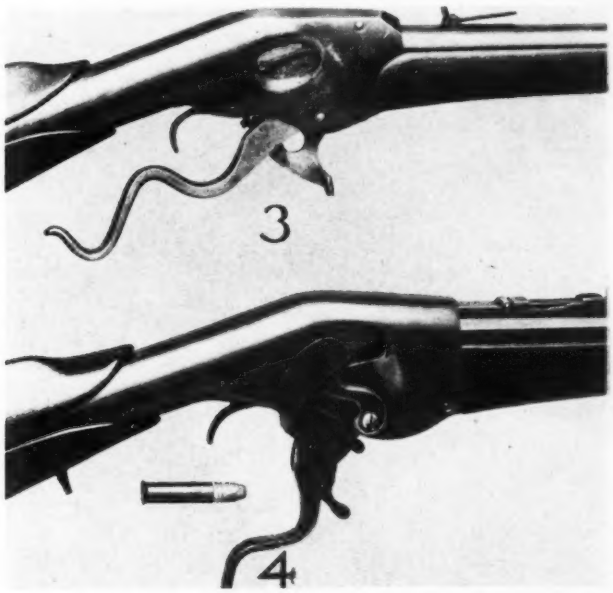
Did you ever hear of a repeating, 4-shot, revolver-style shotgun, or a rifle with the same mechanism, inside whose breech was a big revolver cylinder, from which, on pulling the trigger, the shells were removed from the cylinder, shoved into the chamber, and instantly fired; when, on next cocking the hammer the fired shell was withdrawn from the chamber, returned to the cylinder, and the cylinder turned to bring another shell up ready for a repetition of the process? Yet this very gun attained no small fame at just about 1871, and was known on both sides of the Atlantic. Greener wrote about it in one of his books, and the English history published later on by the Blanch firm illustrated it. Did you ever see its ammunition, big steel shells which—in the early models at least—had no primer of any kind, but had a nipple in the center of the head, on which you put a percussion cap when inserting them in the cylinder for use? Or did you ever see its "detachable choke": a cylinder portion which you could screw on or off from the muzzle, thus giving you an unchoked or a close-choked charge, at your choice of the moment? (7.)

Did you ever hear of the repeating rifle—



No. 1.—Early patent of James Paris Lee, July 22, 1862. Breech-loading single-shot rifle or carbine, caliber .36, rim fire, made in Milwaukee during the Civil War. Very simple action. On cocking hammer, barrel may be swung aside to the right, when working a hand extractor rod extracts the fired cartridge.

No. 2.—Lee single-shot rifle, exactly same as No. 1, except .41 caliber, showing action open. These Lee single-shot breech-loading actions were invented during Lee's residence in Stevens Point, Wis.



Nos. 3 and 4.—Evans repeating rifled carbines, caliber .41. Metal butt stock constitutes the magazine, various models holding from 26 to 34 cartridges, which were fed forward by working the under lever. To load magazine, cartridges were inserted in opening in butt plate, working the lever as each was inserted, a very slow process. Originally patented in 1871, these arms continued to be produced until 1885, with numerous improvements on the system, slight differences being discernible in the two pieces shown. Evans guns were made in both rifle and carbine lengths and are reported to have continued in use as long as ammunition was procurable for them, into the 1900's.

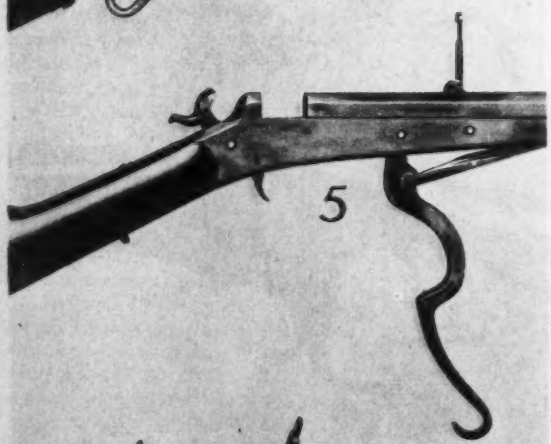
(All photographs used with this article by courtesy of the Milwaukee Public Museum.)

No. 1.—Remington sporting rifle, caliber .41, Rider breech action. Equipped with globe front and adjustable peep rear sights; latter on an ungraduated slide. Date, 1873 or later, as rifle includes patented features of that year. Single-shot.

No. 2.—Remington sporting or target rifle, Rider breech action, caliber .45. Earlier pattern than No. 1, probably about 1871. Single-shot.

No. 3.—Remington sporting rifle, caliber .38. Target rifle with heavy octagonal barrel. Has Hepburn's patented breech action with side-lever and vertical-moving breech block. Date about 1879. A very popular target rifle of the .45-70 period.

No. 4.—Remington - Beals single-shot sporting rifle, .32 caliber. Date, between 1866 and 1870. Throwing down under lever causes barrel to slide forward on frame for loading.



No. 5.—Remington-Beals rifle, exactly same as above, but showing breech opened by under lever.

No. 6.—Early Stevens target rifle and sporting rifle, caliber .32. Breech of barrel tips up on pressing button on left-hand side of frame. Date about 1871. Extremely popular in its day, sixteen different models of this action being made, in all calibers from .22 to .44.

made in both military and sporting styles—whose *butt* was not of wood but of metal and was the magazine, to be packed as full of cartridges as you could get them in, some thirty-two when loaded to capacity, which were fed forward and into the barrel when you worked the under lever? (8.)

Did you ever see a double-barreled hammer shotgun, made in 10- and 12-gauges, with barrels permanently fixed to the stock and which were loaded or unloaded by picking up a broad double breech block and lifting it across to the left, in which hinged section there were a pair of firing pins, and whose opening left the chambers accessible? (9.)

Can you name the breech-loading military rifles, and sporting arms as well, which neither had, nor used, nor were chambered for, cartridge cases of any kind whatever, and whose ammunition consisted wholly and solely of their *bullets only?* But!—what fired these, and where in the world were the powder charges put? Ah! where, indeed. (10.)

Did you ever see a rifle with the world-famous old "Remington" rolling-breech-block action—probably the simplest and one of the strongest breech actions ever invented—which was in every respect exactly like a Remington, yet wasn't one at all? Or did you ever see a double-barreled shotgun with fixed and stationary barrels but with *two* of these same true Remington breech actions, side by side behind the barrels, their finger lugs standing out at right and left, respectively, and which *was* a Remington? Incidentally, some of these guns were perfect beauties, too, with delicately lace-patterned Damascus barrels and parts all covered with engraving and gold-inlaid decorations. (11.)

Can you imagine a military bolt-action rifle whose firing pin drove straight through the material of the cartridge, and on clear through the whole powder charge, and struck a "cap" placed in front of the powder and resting against the base of the bullet? Well, at the date when the National Rifle Association was born, several hundred thousand of these rifles were engaged in one of the greatest wars in history. Incidentally, the gun used on the other side in the same war employed a so-called "self-consuming" cartridge which was supposed to burn up entirely and blow away on being fired, with nothing whatever to extract after the shot, which it often didn't do, leaving a horrid mess of ash and débris in the chamber that almost blocked reloading, also not infrequently blowing enough gas and flame out around the face of the bolt to burn up a handkerchief tied over the breech. Some guns! (12.)

Do you know the regulation United States Army rifle whose big 2-ounce shells were not brass at all, but copper, and were neither rim-fire nor pin-fire nor had any visible primer in the center of the head, either? Can you guess how they were fired? (13.)

Did you ever hear of the American repeating pistol, put out in all sorts of calibers from .22 to .45, for whose four successive shots no part of the mechanism moved at all, save the firing pin on the nose of the

hammer, which revolved a quarter of a turn at each time the hammer was cocked, and struck the successive heads of the cartridges in the four chambers of the superimposed two pairs of barrels? (14.)

Did you ever hear of revolvers, big and little, in all sizes from .22 up to .48, with neat, smoothly acting, excellently made six-chambered cylinders, and *no barrel* whatever in front of the cylinder for the bullets to be shot through? (15.)

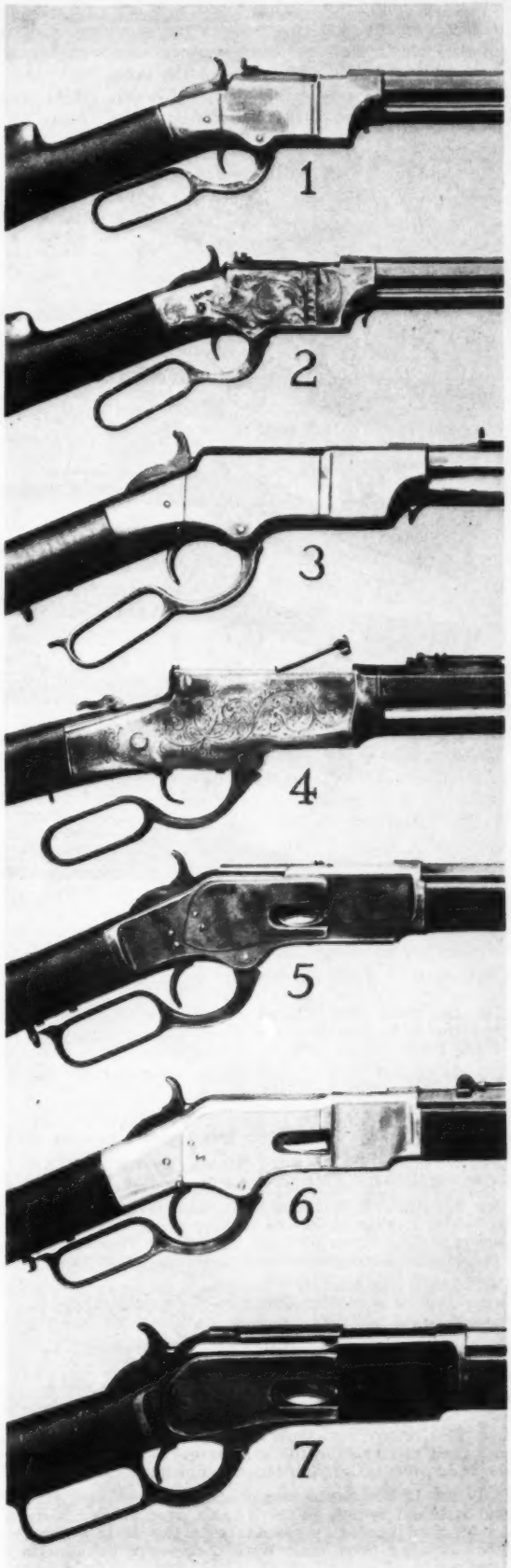
Can you credit the existence of pistols which were *neither* muzzle-loading nor breech-loading, which did not even have any chamber as part of the bore, yet which were so truly among the most accurate arms ever devised that some of them are in use yet, and probably being fired at targets by expert pistol marksmen as you read this? But! if they were *neither* muzzle-loading nor breech-loading, how was any charge ever gotten into them at all? Ah! that's the trick; and yet I have fired them scores of times. (16.)

All these amazing oddities—some of them almost unbelievable—were in use when the National Rifle Association was born. Yes, and some of them were so workable and satisfactory and efficient that they linger in use still.

Now, if we have puzzled our gun-crank readers sufficiently, and have perhaps indicated a very few of the surprising things that exist to be encountered in the study of the history and evolution of firearms, of even as recently as only sixty years ago, we may add here the explanations of the curiosities we have listed among these forgotten guns of the early '70's.

1. This was the English Charles Lancaster oval-bore rifle, whose perfectly smooth interior was oval in cross section, this oval shape turning, so to speak, on the long axis of the barrel throughout its length, with the result that a similarly shaped oval-cross-sectioned bullet which exactly fitted the bore was swiftly spun on its long axis as it passed up the barrel, exactly like any other rifle bullet. On looking through the bore it appeared to be, as it was indeed, as smooth as a mirror. It was eventually discarded on account of the inconvenience of making oval-cross-sectioned bullets to fit it, and of inserting them accurately in the bore when reloading. Yet these guns continued to be manufactured until in the early '80's. The scheme of exactly such a form of smooth "rifling" was revived in America, by the way, within the past decade, for a high-power, modern, bolt-action sporting rifle, and a few guns were actually made on the plan; but it came to exactly what any student of firearms history could have told its "inventor" was inevitable.

2. This was the long and justly famous English Whitworth system of hexagonal boring, the bullets of course hexagonal to fit the bore. When it first came out it was thought the most wonderful gun ever invented, and was by all odds the most accurate arm of its time, but it was eventually discarded for the same reason that did away with the Lancaster guns, the inconvenience



No. 1.—"Volcanic" rifle, caliber .40, earliest predecessor of the Winchester. Designed by Tyler Henry, combining the ideas of the earlier Jennings rifle and patents of Horace Smith. Design purchased by Smith & Wesson, and later by the Volcanic Repeating Arms Co., of New Haven.

No. 2.—"Volcanic" carbine, shorter form of above. Did not use cartridges, but hollow-based bullets, the bases holding the powder charge and topped with a fulminating cap; these carried in the tubular magazine and fed to chamber by the lever. The rifle would hold 36 in its magazine; the carbine held 16.

No. 3.—"Henry" rifle, caliber .44, using rim-fire cartridges. Gun held 12 in magazine and 1 in chamber. Could be fired 25 times a minute. More than 12,000 used by Northern troops in Civil War, also over 4,000,000 cartridges for these. Purchased by originators of Winchester Arms Co. Has double-pointed firing pin.

No. 4.—One of the very earliest true Winchester rifles, evolved from the Henry, caliber .56. Magazine can be loaded either at muzzle end or from rear through a slide in under side of receiver. No marks of maker's name or indication of date on this gun, but probable date about 1870.

No. 5.—Second model of true Winchester lever-action repeating rifles, Model 1873, .44 caliber, with King's loading gate in receiver. Known as the "forty-four-forty," and the most famous gun of the '70's. Manufactured in this model for over 50 years. (This specimen made in 1875 or later, as it has the sliding lid on receiver-top opening, added in that year.)

No. 6.—Model 1866 Winchester, manufactured from 1866 to 1873, .44 caliber. Has bright brass receiver and King receiver loading gate.

No. 7.—Model 1876 Winchester; same as Model 1873 except made larger and stronger for heavier loads than the .44-40 cartridge. Manufactured from 1873 to 1879.

of using bullets of such shape, with the necessity of fitting them exactly to the shape of the bore in loading. Artillery, naval cannon, and field guns were made on the same principle some years earlier, some of which stand today on the battle field of Gettysburg in exactly the battery positions they occupied during the battle. Owing to the sharp angles of the hexagonal projectiles, both bullets and cannon shells, they screamed in flight with a peculiar shrill shriek that was easily distinguishable from every other sound.

3. This was the Lancaster four-barreled repeating mechanism with a revolving striker inside the lock, pirated from the American Sharps pistol, for which see below. As intimated, it was brought out in shotguns, sport-

(Continued on page 44)

VARIETIES AND IMPROVEMENTS OF THE "OLD SPRINGFIELD"

No. 1.—Model 1866 United States rifle altered from muzzle-loader by the Allin system. Breech of original barrel has been cut off and the Allin breech-action block added, being held in place by two screws. Caliber .50. This gun was originally a United States West Point "cadet rifle."

No. 2.—Model 1873 United States "Springfield" Army rifle, caliber .45. A "Buffington" rear sight of date 1879 has later been added to this gun. Has ramrod-bayonet.

No. 3.—Model 1873 United States "Springfield" cadet model Army rifle, caliber .45, weight 8½ pounds. While standard cadet model of its time in all details, this gun appears to have been a special product, as its stock is much lighter in color than the regulation arm.

No. 4.—Model 1884 United States "Springfield" Army rifle, caliber .45. On this gun a Model 1888 rod bayonet has been added; otherwise regulation. This type of gun used by New York State Militia. Butt is stamped: "65th Regt., S. N. Y."

No. 5.—Officers' Model sporting and target rifle, "Springfield" action, .45 caliber. These very fine guns cost the Government $27 each to make, having checkered stocks, white metal caps, globe, peep and buck-horn rear sights, and set triggers. Trigger usable as regulation style, but on pushing the trigger forward before cocking the hammer, it became a set trigger, actuated by a very slight pull. These guns were greatly admired and popular on the Western plains in their day.

No. 6.—United States "Springfield" Army rifle showing Rice-Chillingworth trowel bayonet, the invention of Lieut. E. Rice; first approved in 1873 but officially discarded in 1879, though agitation on its behalf continued for ten years thereafter. Scabbard for this form of bayonet shown at right.

No. 7.—Model 1879 United States "Springfield" Army rifle, caliber .45, with every alteration and improvement made since 1873, except rod bayonet, which has been altered.

No. 8.—Model 1873 United States "Springfield" cavalry carbine, caliber .45-55-405; a lighter charge than the regulation Army rifle cartridge. This was the arm of Custer's men in the Battle of the Little Big Horn, June, 1876.

No. 9.—United States Army "Springfield" sharpshooter's special rifle, Model 1884, but altered from regulation infantry rifle by being designed and chambered for a longer and more powerful cartridge, the .45-80-500. Heavy octagonal barrel. Special rear sight, which, however, has no graduations on upright leaf. Checked grip and fore end.

No. 10.—United States Army shotgun, 20-gauge, made by reaming out a .58-caliber barrel. This gun has a Model 1873 lock plate, but is of later date as these arms were not made until 1881, at the suggestion of Col. J. C. Kelton. Their issue for the use of soldiers in the field proved so popular that two of these shotguns were issued to each company of soldiers on service in the West and in other good hunting territory. With them were issued also shells, primers, wads, and loading tools for reloading shells, sufficient for one year's use, at expiration of which period a fresh supply could be drawn.

Jennings rifle. Side plate and hammer removed

Early Winchester Rifles

By EDWIN PUGSLEY

Vice President and General Manager, Winchester Repeating Arms Co.

WHEN tracing the history of anything, be it the genealogy of your family or the origin of a tradition, the searcher is led into curious byways. Such is the case when tracing the genealogy of the Winchester rifle, an arm that sprang into prominence within the period of a few years, its name becoming one of the dominating names of the early '70's.

Attempts at repeating mechanisms for small arms are recorded among the earliest specimens in the various arms museums and collections throughout the world; but without exception they were doomed to failure. There are examples of repeating match locks, revolving wheel locks, lever-action repeating flintlocks, while the percussion period abounds with attempts to produce a satisfactory repeating rifle.

For our particular purpose, the story of repeating rifles begins in the small town of Windsor, Vt., back in 1849, with a rifle named the Jennings rifle, now known only to larger collectors of firearms. We are indebted to Mr. Guy Hubbard for the very complete data which he has gathered on the early history of the Jennings rifle, which he has traced back to the Hall breech-loading flint. We must, however, pass over all this interesting history and begin with the Jennings patent, in 1849. This rifle was the product of many men, but particularly to two men—Jennings and Hunt—and was financed by Mr. Cortland C. Palmer, a prominent capitalist of that day. The guns were built in the old Robbins & Lawrence factory in Windsor, probably most famous for the Robbins & Lawrence arms furnished the United States Government during the Civil War. This Jennings rifle comprised the essential features of the later Winchester models, in that it had a tubular magazine underneath the barrel, a rising block, or carrier, which conveyed the ammunition from the magazine to the level of the chamber, and a bolt which pushed the new ammunition from the carrier into the chamber of the barrel, and afterwards served as a breech block, when in its forward position. On top of the gun there was a round, boxlike compartment, which held pellets of fulminate. The long-nosed hammer, on its downward travel, picked out one of these pellets, carried it into a properly shaped recess, and, at the bottom of the stroke, fired it, the fire being communicated to the propellant charge which was housed in the base of the bullet. The cartridge case had not yet been invented, and the ammunition for this gun consisted of a large, conical ball of about .45 caliber having a deep recess in its base, the black powder being loaded into this recess. When the gun was discharged it was necessary to support the breech pin against the recoil, and this was accomplished by a pair of links on each side of the breech block, these links being slightly below center when locked.

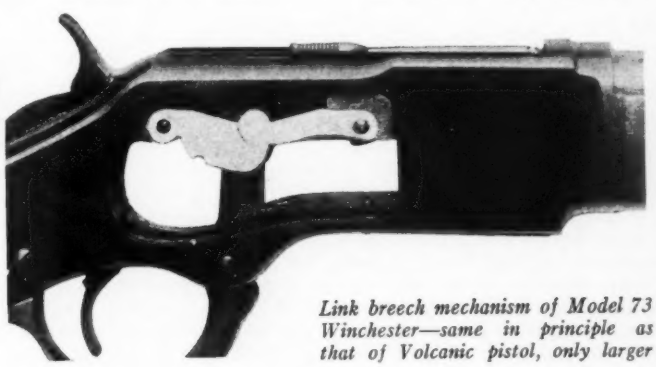
Jennings rifle. Action closed, in firing position. The round box on top of receiver is the "pill box" mentioned in the article

One of the mechanics who worked on the early development of the Jennings rifle was D. B. Wesson, who shortly formed a partnership with Mr. Smith, and together they further refined this Jennings system, using, however, the identical mechanism. In Norwich, Conn., in 1854 the new firm of Smith & Wesson produced the Volcanic pistol. This pistol differed markedly from the Jennings rifle only in the fact that in place of the black-powder propelling charge in the hollow base of the bullet, the new inventors substituted fulminate of mercury, thus using this as the propellant charge as well as the priming charge, there being no powder used in this loaded bullet. This obviated the necessity of the pill box, which was the firing mechanism of the Jennings.

As had been the case with the Jennings rifle, success failed to crown the efforts of these two young inventors in their Norwich venture, and it was necessary for one of the men who had furnished capital to take over what could be salvaged in the way of patents, machinery, etc., from the wrecked Norwich concern. This man was none other than Oliver F. Winchester, Lieutenant Governor of Connecticut, who at that time was a large manufacturer of shirts in New Haven. Governor Winchester moved the arms company to New Haven, and with fresh hopes started the manufacture of the Volcanic pistol in 1855, under the new firm name of the Volcanic Arms Co. of New Haven. Unfortunately, however, the ammunition of the Volcanic arms made in New Haven was no better than that made in Norwich, and the venture again proved a failure.

About this time, Governor

Link breech mechanism of Volcanic pistol made in New Haven by Volcanic Arms Co.

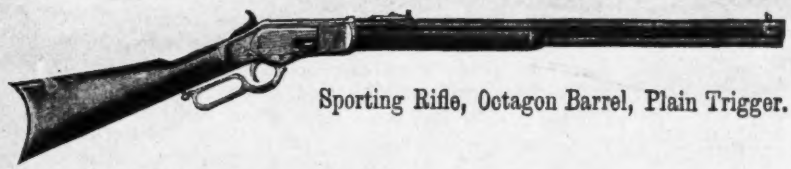


Link breech mechanism of Model 73 Winchester—same in principle as that of Volcanic pistol, only larger

Model 1866.

Sporting Rifle, Round Barrel, Plain Trigger.

Price,	$28.00
Length of Barrel,	24 inch
Caliber,	44–100
Number of Shots,	17
Weight,	9 lbs



Sporting Rifle, Octagon Barrel, Plain Trigger.

Price,	$30.00
Length of Barrel,	24 inch
Caliber,	44–100
Number of Shots,	17
Weight,	9½ lbs

From an old Winchester catalogue

Winchester heard of a mechanic by the name of B. Tyler Henry, who was making a reputation in gun invention. Mr. Henry had, incidentally, worked on the early models of the Jennings rifle and was familiar with the mechanism. Mr. Henry became associated with Mr. Winchester, and a new company was formed, in 1857, called the New Haven Arms Co. Henry was quick to see that the defects of the Volcanic pistol lay in its ammunition and not in its mechanism. The metallic rim-fire cartridge had recently made its appearance, and Henry discarded the unsatisfactory Volcanic ammunition and redesigned the pistol to use metallic rim-fire cartridges.

It is generally assumed that the function of the cartridge case is that of a container for holding together the bullet, powder, and primer, but in reality its prime function is that of a gas check to prevent the rearward leakage of gas at the moment of the explosion, as is no doubt well known to readers of THE AMERICAN RIFLEMAN. Before the invention of the cartridge, no device had been perfected which would prevent the gases from blowing back into the mechanism. The cartridge accomplished this result, and thus made possible all of our modern breech-loading and automatic arms. Immediately upon the introduction of the Henry rifle with its .44 rim-fire cartridge, loaded with black powder and giving a velocity of about 1,000 feet per second, the future of the Winchester rifle was assured. Its sureness of fire, easy operation, and quickness of reloading were a marvel to all who saw it.

It is essential that the reader review as nearly as possible the conditions which existed in the late '60's, and create for himself a background against which he may picture this development. During the Civil War it was not unusual for captains to recruit and completely equip their own companies, or for companies to be equipped by contributions from their own members. Many of these self-equipped companies carried the Henry rifle, and the early catalogues of the New Haven Arms Co. contain many interesting testimonials, which also throw considerable light on the general status of firearms for that period.

Sensing the commercial possibilities, Governor Winchester reorganized the New Haven Arms Co. in 1866, and established the Winchester Repeating Arms Co., which produced the first Winchester, Model of 1866. These first Winchesters were for a while referred to as the improved Henry, and took on a slightly different outline, although the internal mechanism remained the same.

In the latter part of 1866 the Winchester Repeating Arms Co. moved from New Haven to Bridgeport, where the early Model 66 Winchesters were made. Having outgrown their quarters in Bridgeport, Mr. Winchester decided he would move back to New Haven and greatly enlarged his plant, so that in the early part of 1871 the new buildings which had been erected along the old Canal Road on the outskirts of New Haven were occupied, and manufacture in the present Winchester plant began. We are indebted to a very excellent article by Mr. L. D. Satterlee in the December 15, 1924, issue of the RIFLEMAN for a detailed history of the Model 66.

When this new plant was projected, it got out that the Governor was planning to manufacture 200 of these "new-fangled rifles" per day. Such foolhardiness had never been heard of before, and the town felt quite sure that the Governor had gone out of his head. It was pointed out that a week's operation of such a colossal plant would produce more guns than could be sold in a year. We may smile today at the lack of foresight of the general public, but have we not ourselves experienced similar distrust of our ideas? Before 1914, a million of anything was an almost unheard of quantity, and the word "billion" was used only by school children, few of us remembering where the decimal point should be. Now, however, we talk quite as easily of millions as we formerly did of thousands, and we are able

to point off a billion without much thought. The old Governor was one of the men who started this mass consciousness so prevalent today.

In 1873 the first practical repeating center-fire rifle appeared from the new plant in New Haven. Mechanically and ballistically the Model 73 Winchester was years ahead of any of its contemporaries. The velocity of the bullets had been increased to about 1,300 feet per second, and the quality of the center-fire ammunition was considerably ahead of that of its rim-fire ancestors. Priming mixtures were, of course, not well understood, and the modern chemistry of powder had not begun. However, as is evidenced by many testimonials, the Model 73 Winchester was in a class by itself. A few years later the .44 carbine was introduced, and the gun was also produced in .38 caliber, and later in .32 center-fire, which is now sometimes known as .32-20. In 1884 the gun was adapted to handle .22 short and .22 long cartridges, the magazine of the .22 short arm holding twenty-five cartridges, and the rifle handling this cartridge with considerable accuracy.

It must be understood, however, that the course of the new arm and its producing company was not an easy one. Prejudice was rife, and the Regular Army officers in charge of selecting arms for the nation were much against the breech-loader, one of the boards complaining that in case the troops ran out of fixed ammunition the guns could not be used as muzzle-loaders.

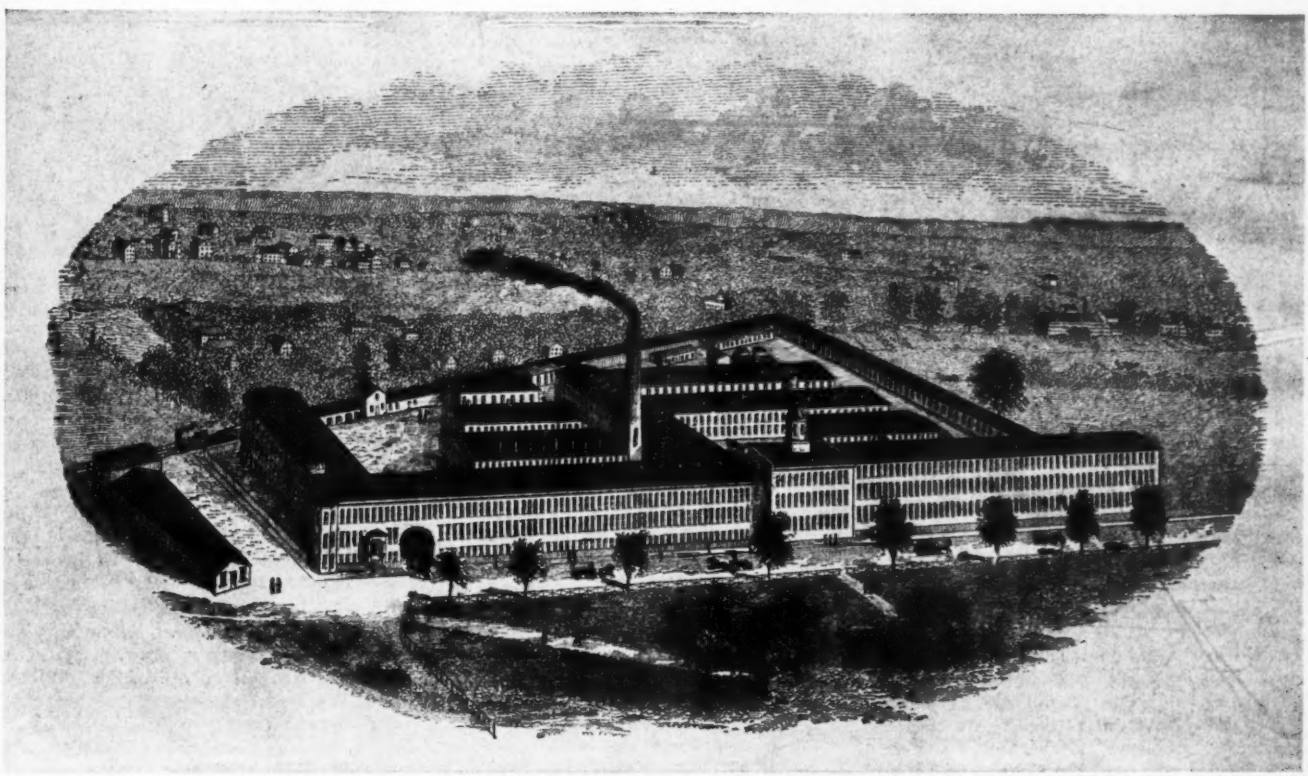
At this time the only repeating rifle in competition with the Winchester Models 66 and 73 was the Spencer rifle, which made such a good name for itself in the latter part of the Civil War. The Spencer, however, was ballistically inferior to the Winchester. It was a clumsy arm for sporting purposes, and it required the cocking of the hammer for each shot, in addition to operating the finger lever. This was not the case with either the Model 66 or the Model 73 Winchester, and while there were many Spencers in use, they were not comparable in facility of handling or accuracy to the Winchester. However, the Spencer had possibilities which the Governor recognized, and he decided that it would be best not to let the competitor get too far. Consequently, in 1869 the Winchester Repeating Arms Co. bought the Spencer Company, which effectually stopped any further competition from that source. Mr. Satterlee, in his article on the Model 66 above referred to, calls attention to an advertisement in 1869 of the sale of 5,000 Winchester repeating muskets, 5,000 Winchester sporting rifles, 5,000 Winchester carbines, 2,000 Spencer repeating muskets, 30,000 Spencer repeating carbines, 500 Spencer repeating sporting rifles, and 2,000 Jocelyn Single B. L. rifles, as a result of this combination.

The other big competitor of the Winchester at that time was the Sharps rifle, probably the most accurate percussion arm ever produced. This gun was in the process of being transformed from its paper-cartridge percussion-cap history, to the cartridge gun of the late '70's and early '80's. Its great drawback, however, was the fact that it was a single-shot and lacked the enormous advantage of the rapid repeater. While I have mentioned only the Spencer and the Sharps, there were various other guns on the market at that time, but none were of sufficient merit to leave their names except as examples in the various arms collections.

The possibilities of the Model 73 were further enhanced by the Colt Company's producing the now famous Frontier model revolver, which handled the same cartridge as the Model 73. Remington also produced a very splendid heavy revolver using these same cartridges. Following the lead of these two companies were several other revolver concerns, so that the frontiersmen were not handicapped by the necessity of carrying two calibers of ammunition.

It is hard for us, accustomed as we are to the accuracy and uniformity of factory-loaded ammunition, to picture the astonishment of the muzzle-loading shooter when he was once persuaded to try one of these new breech-loaders. Muzzle-loading was still used in the majority of the shooting, especially in the South, the West being at least ten years ahead of the rest of the country in its general adoption of the breech-loading rifle and revolver.

Popular as the new gun was, the company experienced a hard struggle financially, until it made some large and profitable contracts with foreign governments. A contract with the Turkish Government, completed in 1871, put the company on a sound financial footing. This contract called for production of



Winchester factory in early part of 1871 (from an old Winchester catalogue)

50,000 Model 66 Winchester guns, for which the company received $28 apiece. There were also 4,000,000 cartridges and 16,000,000 empty shells accompanying this order. Ammunition orders continued to come in from 1874 to 1878, one notable order being for 200,000,000 Martini-Henry shells and bullets, with another for 80,000,000. Mexico proved to be a good customer, although payment was always in jeopardy. An article in the December, 1930, issue of the *North American Review* gives very graphically the experiences of some of the early sales people in endeavoring to collect payments for arms from foreign governments.

The Remington gun that was famous at that time was one with a single-shot rotating breech action, which was sold in very large quantities to many governments, including the United States. The standard Government cartridge was the .45-70, developed in the early '70's as a result of the many attempts to alter over the percussion muskets left from the Civil War.

Recognizing the increasing demand for heavier cartridges, and feeling the competition of the powerful single-shot arms such as Remington, Sharps, and others, Winchester, in 1876, produced a gun—Model 1876—which was displayed at the Centennial in Philadelphia, and was sometimes called the "Centennial" gun, which was an exact enlargement of the Model 73. This was made for a variety of now obsolete cartridges, such as the .40-60, .45-75, .45-60, .50-95, etc. These large-caliber black-powder cartridges had considerably more striking energy than the .44 used in the Model 73. Roosevelt's early stories of his ranch life picture him with this Model 76 rifle. The Model 76 carbine, using .45-75 cartridge, became the regular arm of the Canadian Mounted Police, and was not abandoned by them until the late '80's. One of the most famous encounters in which this gun was used was the suppression of the Riel Rebellion,* a religious revolt in the northwest of Canada in 1878. The Model 76, however, with its link-supported breech, was not strong enough to withstand the pressure of the now popular and well-established .45-70 cartridge, and it became necessary to develop a gun for this particular cartridge.

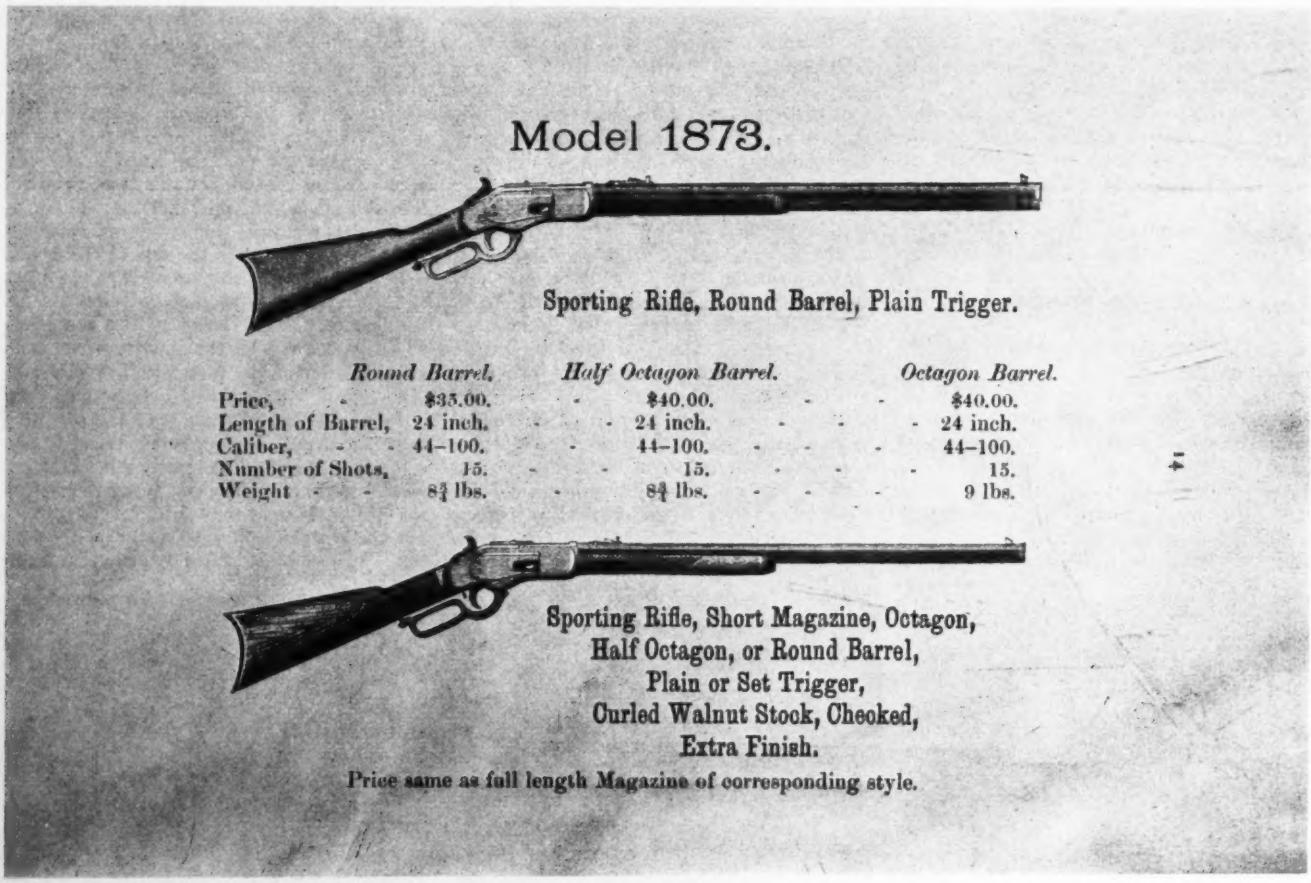
Turning back for the moment, we see that the mechanism in Winchester Models 76, 73, 66, Henry, New Haven Arms Co. Volcanic, Norwich Arms Co. Volcanic, and Jennings rifles is all essentially the same, the great improvement being in the development of the ammunition.

In August, 1878, Winchester announced the Hotchkiss magazine gun. Bolt-action rifles were new in this country at that time, and the Hotchkiss was one of the first of this type to be introduced. It was not successful as a hunting arm, as it was too slow to operate compared with the lever action. A considerable number of the military muskets were made and sold to foreign governments, and a few to the United States.

It was in 1879 that a gun was patented in Ogden, Utah, which was the forerunner of a line destined again to be "heard around the world." This patentee was the young J. M. Browning, one of several brothers, and the son of an expert gunmaker. This Browning rifle, a single-shot, which was put out in a small way by the Browning Brothers, was purchased by the Winchester Repeating Arms Co. about 1884, and the first Browning design Winchester was put on the market in 1885, as the Winchester single-shot.

Mr. Browning was a prolific gun designer, and his single-shot was soon followed by the Model 86 Winchester, which took the .45-70

(Continued on page 48)


Model 1873.
Sporting Rifle, Round Barrel, Plain Trigger.
Round Barrel. Half Octagon Barrel. Octagon Barrel.
Price, $35.00. $40.00. $40.00.
Length of Barrel, 24 inch. 24 inch. 24 inch.
Caliber, 44-100. 44-100. 44-100.
Number of Shots, 15. 15. 15.
Weight 8¾ lbs. 8¾ lbs. 9 lbs.
Sporting Rifle, Short Magazine, Octagon,
Half Octagon, or Round Barrel,
Plain or Set Trigger,
Curled Walnut Stock, Checked,
Extra Finish.
Price same as full length Magazine of corresponding style.

From an old Winchester catalogue

* Lewis Riel was born in Manitoba, Canada, October 23, 1844. He was the leader of the rebellion which broke out in 1869. In the summer of 1870, finding resistance hopeless, he fled to the United States, where he remained for some time. In 1873 and 1874 he was elected to the Dominion Parliament. He attempted to take this seat, but was expelled. In 1878 it was thought he entered into a conspiracy with the Fenions of Northwestern Canada. Again in March, 1885, he was elected president by the natives of that territory, of a government establishment in St. Laurent. Troops were sent against him; he was captured and tried for high treason, was condemned, and was hanged November 16, 1885.

Centennial, or Model 1876.

Sporting Rifle, Plain.

	Round Barrel.	*Half Octagon Barrel.*	*Octagon Barrel.*
Price,	$40.00.	$45.00.	$45.00.
Length of Barrel,	28 in.	28 in.	28 in.
Caliber,	45–100.	45–100.	45–100.
Number of Shots,	12.	12.	12.
Weight,	9¼ lbs.	9¼ lbs.	9¼ lbs.

16

TARGET RIFLE.

With Pistol Grip, Vernier and Wind Gauge Sights.

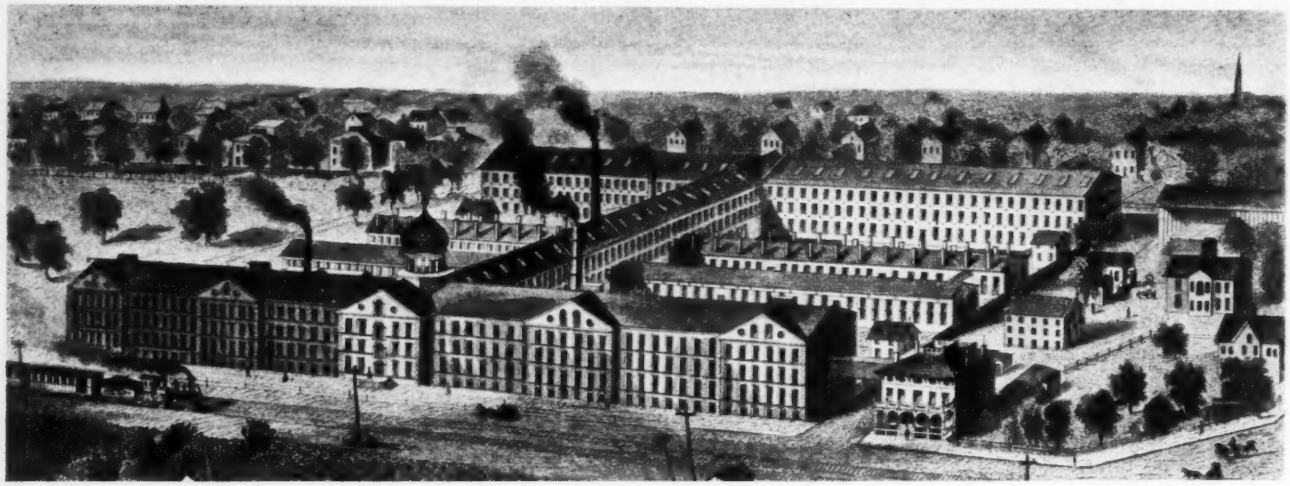
Sporting Rifle, Plain.

	Round Barrel.	*Octagon Barrel.*
Price,	$25.00	$27.00
Length of Barrel,	26 in.	26 in.
Caliber,	45–100	45–100
Number of Shots,	6	6
Weight,	8¼ lbs.	8½ lbs.

Price per 1,000, $35.00.
Case contains 1,000.

Powder 70 grs.
Bullet 405 "
Composed of 1 part tin and 16 parts lead.

Upper: Centennial rifle. Lower: Hotchkiss rifle (from an old Winchester catalogue)



The Colt Armory in 1874

Colt's Arms in the '70's

By A. L. ULRICH

Secretary Colt's Patent Fire Arms Mfg. Co.

THE early struggles, the failures, and the final triumph of Col. Samuel Colt have been the subject of very many interesting newspaper and magazine articles. The period from 1895 on has also been covered by elaborate articles descriptive of the inception and development of the Browning automatic system of firearms, an invention as wonderful and romantic as the discovery of Colonel Colt. But the middle period, dating from the close of the Civil War to the hurried preparation for the Spanish War—that hard-working, drab interval that called for planning, working, risking, losing and learning, the time which called for faith and patience—has not received its full share of credit, for without the background and experience obtained in those trying days, the later successes of the company could never have been consummated; hence this article, which will try to show what the Colt Company was doing during the time which also saw the rise from youth to a successful maturity of that organization known as the National Rifle Association of America.

The late '60's, the '70's, and the '80's presented their problem for the managers of the Colt Company. The glamour of a new invention and the great interest aroused all over the world by Colonel Colt's improved revolver, also the great demand for war supplies, had passed. It was up to the managers to produce a superior article under competitive conditions, as many imitations of the revolvers and rifles had been placed upon the market. Then, again, the personality of the venturesome Colonel was no longer an asset, his death having occurred in 1862. However, this problem met its solution at the hands of such men as E. K. Root in improved machinery, in perfecting the means of securing interchangeability of small parts, and in installing a shop system which spurred each department to turn out its particular article as nearly perfect as possible. With such an able mechanical head as Mr. Root, and with a Civil War officer, Gen. William B. Franklin, as manager, aided by a score of highly efficient superintendents and foremen, the combined energies of the organization were directed toward the production of new types of arms to meet public demands. Unoccupied buildings were rented, and special machines were made to order.

In the factory during this period many inventions were brought out by the company on its own account, or were developed for private parties. Among them were the Gatling Gun, the Wardwell Sewing Machine, Ticket-Cancellers, Hay-Loaders, the Thorne Type-Setting Machine, the Paige Type-Setter (in which Mark Twain was interested), Printing and Embossing Machines, Baxter Portable Engines, the Disk Marine Engine, and the Hills Archimedean Lawn-Mower, the latter believed to be the first practical machine for lawn use ever perfected. The rented portions of the buildings saw the beginnings of many companies in full blast today, such as the Atlantic Screw Works and the Whitney Chain Co.

In the early '70's a radical change in the kind of ammunition used in revolvers and rifles led to new designs in the manufacture of firearms. For years the gunmakers of Europe had been experimenting with metallic shells for rifles and revolvers, previous to which period arms had for years been loaded with loose powder and ball, and exploded by means of percussion caps. When a practical metallic cartridge had been produced, all makers of small arms proceeded to make over their arms to receive it, or to construct new types to use the new cartridges.

The modern shooter who quarrels with his ammunition should contrast his position with that of his forbears. Picture a pioneer with an empty cylinder in his rifle or revolver, having to use, perhaps in a driving rain or snow, first the old powder horn for the powder, then seat the bullet and ram it home, and finally fit a wee percussion cap on the nipple, with benumbed fingers, all the while keeping a sharp eye on a big Injun behind a tree a few yards away. There are many things to be thankful for even if some of us did get a bad break in 1930.

The first revolver brought out by the Colt Company for metallic ammunition was the .45-caliber Single-Action Army, on which experiments were made at the factory in connection with the United States Ordnance officers for a period of three years, from 1870 to 1873, resulting in a large order being placed by the Government for the Single-Action Army Model. This model was adopted as the official arm of the Army and Navy, and was regularly manufactured for these departments up to 1894.

This same model was made for commercial sale, and won great fame in the wild Western country, being almost exclusively adopted by the pioneers, cattlemen, miners, prospectors, and officers of the law. This .45 was known as the Peacemaker, and when made for the .44-40 cartridge was also called the Frontier model. When bored for the latter caliber cartridge the owners of rifles of that caliber could use the same ammunition in both rifle and revolver. The same model was afterwards made for other revolver and rifle cartridges. This revolver, being strongly made and of simple design, played its part well in the transformation of the wilderness into a safe place for trading and colonization. Many tales have been told of the wonderful marksmanship of the early frontiersmen

equipped with this arm, and it is of interest to note that the Colt Company still manufactures and markets in quantity this same old reliable shooting-iron, on which certain refinements have been made to adapt it to modern conditions.

This period of adoption of metallic ammunition also saw entrance of rapid-firing machine guns. The Gatling Gun, brought to a point of perfection at the Colt works, held first place in warfare up to the advent of automatic machine rifles in 1896. The Gatling Gun was brought to the Colt Company by Dr. R. G. Gatling for development and manufacture, and its success was due in no small measure to the foresight of Dr. Gatling as to the use of such a weapon in warfare. It is said that it was not the intent of the Doctor to produce an arm of extermination, but, as he expressed it, "to make war so terrible that nations would cease from settling their disputes in that manner." If the good Doctor could have foreseen the use of submarines, aerial bombs, and poison gas, he would have had no apology to make for his machine gun.

The Double-Action Revolver followed the Single-Action, and was made in practically the same calibers and used for the same purposes by the Government and the public where a double-action or self-cocking weapon was preferred. Smaller revolvers in both single and double action were manufactured in the '70's for pocket and holster use. In this period also, large quantities of the Derringer pistols were made, in two styles, the Colt and the National; both small, vest-pocket weapons, single-shot, shooting the .41-caliber rim-fire cartridge. A rather interesting arm was designed in 1872 by Charles Richards, an engineer in the employ of the company, in the shape of a small, 4-shot revolver, sometimes called the "cloverleaf" model from the likeness of the end of the cylinder to a four-leafed clover. It was also dubbed the "Jim Fisk" model, as an arm of this type was used by Stokes in the murder of Fisk. Only a limited quantity of this type was produced.

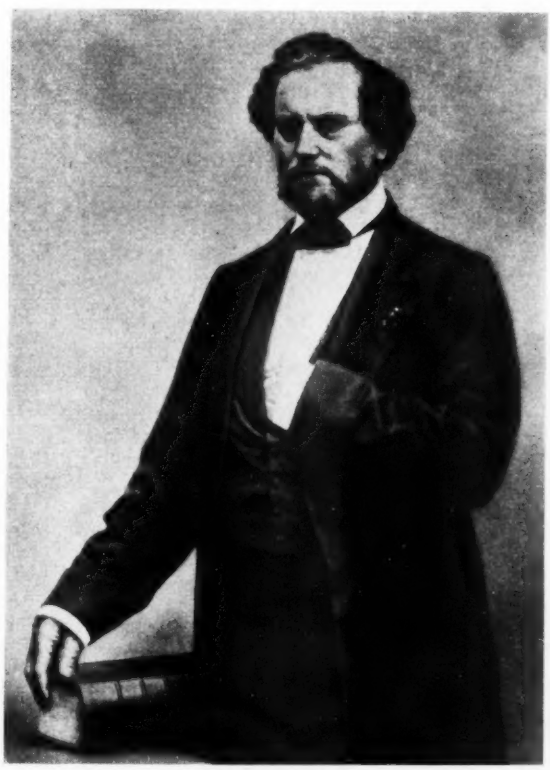
The development of Dr. Elliot's patent on rifles, which provided for operation by means of a sliding forearm, led to the bringing out in the '80's of a full line of sporting rifles in all the then popular calibers, from .22 to .50-95, all shooting black-powder ammunition. These rifles were marketed up to 1908. These "Lightning Rifles," so called, were of course a radical change from the well-known and long-used lever-action types, and in time the sliding-handle principle was applied to many other makes of rifles and shotguns.

In 1889 another startling change in revolvers occurred when the swing-out cylinder was produced, the first model being the New Navy, which was adopted by the United States Government in 1895. This style of revolver, with its laterally swinging crane and cylinder, and simultaneous system of ejecting the empty shells, immediately became very popular and was made in .38 and .41 calibers for the trade. Pages might be written about the opposition to this type of revolver, as the new features were objects of distrust by many old shooters; but at the present time most American and foreign revolvers follow the New Army and New Navy models of the 1888 patents.

In 1878 the Colt hammer shotgun in 10- and 12-gauge was placed upon the market. These were high-grade arms and were entirely of Colt construction, with the exception of the barrels, which were imported from Belgium. The different grades of barrels were Twist, Laminated, and Damascus, and the prices ran from $50 to $85. Many elaborately engraved guns were made to order, costing from $100 to $300 each. The hammerless Colt shotgun brought out in 1885 was considered the most perfect gun up to that time. The prices of these hammerless guns ran from $100 to $160 each, with extra charge for ornamentation over and above the engraving placed on the regular models. These guns were made in the same size as the hammer guns, but special arms were made to order. There is record of a special hammerless shotgun made for President Grover Cleveland in 8-gauge for duck-shooting, this gun being the special pet of the sporting President. The regular production of shotguns was discontinued in 1900. Many are in use at the present time, having rounded out a shooting age of from 40 to 50 years.

Colonel Colt had in mind many schemes for the expansion of his manufacturing industries. He had planned to build in the large tract of land owned by the company near the present armory an immense plant to manufacture, in connection with small arms, cannon, cartridges, uniforms, leather goods—in fact, all supplies necessary to equip an army. He at one time had arranged to set aside a large fund to endow a technical school for the training of mechanics and engineers on the same lines as the scientific colleges of the present day but, owing to some disagreements with local authorities, he either gave up the idea or left it for future consideration. All of these intended improvements, which would have meant so much to the city of his youth and middle age, were never carried out, because of his early death at the age of 48.

From early youth Colonel Colt believed in the value of the submarine mine and torpedo for the protection of harbors and for the destruction of enemy ships; and after the failure of the Paterson factory he made many experiments along these lines, and sought the assistance of the Government, but with very little encouragement owing to the distrust of the authorities of such appliances at that time. However, some interesting experiments were made: It is a matter of record that with his submarine mine on the Fourth of July, 1842, he blew up the old gunboat *Boxer*, lying in the bay off Castle Garden, he being at the time on the deck of a United States warship some distance away. On August 20, 1842, in the presence of the President of the United States, General Scott, and some of the heads of the Government departments at Washington, Colonel Colt destroyed by torpedo a schooner in the Potomac River, he himself being stationed 5 miles from the vessel. Because of the lack of encouragement the valuable experiments of the Colonel were not followed up, and it was not until the use of torpedoes in the Civil War that their importance in warfare was recognized. If one recalls his history of the Rebellion, he will remember that not all the Union Naval officers were as successful in "damning the torpedoes" as was Farragut in the Mississippi River.



Col. Samuel Colt

Another interesting and successful project was the building of a dyke to protect some two hundred and fifty acres of land from the floods of the Connecticut River. This land was considered as of little value on account of the annual inundations, and was purchased at a low price. When the dyke was completed it fully protected the Armory and the grounds of the Colt estate, "Armsmear." The banks of the dyke were planted with ozier willows to prevent

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FORGOTTEN GUNS OF EARLY '70'S

(Continued from page 36)

ing rifles, and pistols. The pistols weighed up to 2 pounds 8 ounces. And what a husky Hercules of a British sportsman it must have taken to lug around one of those *four-barreled, .577-caliber* "express" elephant guns! Yet they were all made up to as late as 1885.

4. This was the Bacon breech-loader, the invention of a retired British Marine artillery officer, not a little fancied in its brief day. Some pieces were handsomely Damascened or case-hardened and ornamented and engraved. It was eventually discarded because of the inevitable slowness of operating, opening, loading and closing the two right- and left-handed bolt handles.

5. This was the long-famous and not yet extinct French Lefauchaux system, in which the barrels tipped up for loading, but on a link and pin on the front end of the rigid fore arm. The barrels, on returning, were forced home against the breech face by a cam operated by a crosswise-acting lever under the fore end. Light rifles and pistols are still made on very much this system in France, Belgium, and Germany today. In its original form, as here described, it was probably the crudest and weakest method of holding a gun closed ever seriously offered and manufactured in quantity, as, when shut, the barrels were held against the breech solely by the jamming action of a small cam in the fore end. It was speedily improved, however, by the addition of locking-down lugs and the substitution of a hinge pin for the original link-and-pin connection, thus rendering it much stronger and quite practical. Its idea of tipping up the barrels for loading was nevertheless the first appearance of such construction, in which detail it was probably the first embodiment of the system on which millions of guns have been made ever since.

6. This was the "Walsh" gun, invented by none other than a one-time editor of the famous London *Field*. Its remarkable hinged, doorlike lock plates are illustrated in Greener.

7. This was the American Roper system, in both shotguns and rifles, originally manufactured at Amherst, Mass.; later in other localities. Some shotguns and rifles were interchangeable on the same stock. The writer has personally seen one of these guns surviving in use at prairie chickens in the Middle West. The mentioned "detachable choke" was even re-"invented" in recent years.

8. This was the Evans repeater, whose cartridges were fed from the metal butt-stock magazine by a revolving helix or "endless screw" forward to the chamber on the operation of a trigger-guard under lever. In filling the magazine in the butt it was probably the slowest gun to reload ever put out, as on inserting the cartridges through the butt plate each one had to be worked forward by continual pumping of the lever until the stock was full. (The Evans idea, however, of using the butt itself as a commodious magazine capable of holding a large number of cartridges, was re-embodied, as late as the '80's, by an Austrian inventor, one Schulhof of Vienna, in a bolt-action repeating rifle, the operation of whose bolt worked a ratchet device which pumped the cartridges — 28 in number — one after the other into position under the bolt, where they were lifted by a carrier and on the return of the bolt shoved into the chamber. It was a strongly made arm and even praised by Greener, but far too complicated for general use.) Clumsy and slow as were the Evans guns, they nevertheless attained a considerable popularity, and the writer has heard of one being seen in the hands of a Kentucky mountaineer in recent years.

9. This was the Ethan Allen gun, one of the strongest of its time, manufactured in 10- and 12-gauge. It had both a handle on the hinged double breech block and an under lever, used reloadable steel shells, and it was claimed for it that it could be reloaded quicker than any other gun in existence in the year of its prime, 1871. With many excellent points of merit for the time, it has nevertheless so completely disappeared from human ken that the writer has heard of but two specimens in many years.

10. There were not less than four kinds of these curious repeaters made for ammunition consisting, as has been said, of *bullets only*. These were the Jennings, the first Henry repeater, the early Smith & Wessons, and the Volcanic arms. The secret was, as will perhaps have been guessed, that the bullets were themselves hollow at the base, this hollow being filled with the powder charge and a primer affixed.

11. This was the Rider rifle, its inventor soon becoming a member of the Remington staff, when these guns came out under that name. A few of the double-barreled guns mentioned were brought out experimentally, and the excellent mechanism was promptly pirated in Europe and manufactured in Belgium, France, and Germany. Some of the German pieces with the Rider-Remington breech block were very handsome, well made, and beautifully decorated guns. The long-famous Flobert arms were really a foreign appropriation of Rider's breech block. A curious variety of the Rider breech as once manufactured by the Remington firm was a 7-bore gun, whose big round barrel contained no less than seven complete rifled bores chambered for rim-fire cartridges, these fired *simultaneously*—the seven bullets off at once! These guns were made in .22 and .30 caliber, the former once advertised in this country as a "goose gun" and the latter receiving at least some use abroad as a "riot gun." Incredible as the idea of these seven simultaneous shots may seem the Nunnemacher collection has an excellent specimen of the .30-caliber arm, a piece once owned by the French Government but apparently of genuine Remington manufacture.

12. This military rifle was the famous German "needle-gun" used in the Franco-Prussian War; the opposing arm being the French "Chassepot."

13. The seeming puzzle as to the ignition of these United States Army cartridges is explained by the fact that the primer was affixed *inside* the center of the head of the shell, where it was exploded by the blow of the firing pin on the outside of the thin copper head. Early United States Springfield ammunition was made in these smooth-headed copper shells to the number of hundreds of thousands, perhaps millions, of rounds of service ammunition, which lingered in service issue up to less than forty years ago, in the writer's personal experience. On the occasion of the thrillingly dramatic and spectacularly suicidal deaths of the Cheyenne murderers, Head Chief and Young Mule, at the Lame Deer Agency, before the rifles of a troop of the First Cavalry and the Indian Agency Police, these cartridges were used by the soldiers. (The story is told in full in United States Indian Inspector James McLaughlin's great book, "My Friend the Indian," pp. 303-306.) Similar ammunition, the invisible primer inside the shell head, was long made and used in Europe, where the writer has fired it in both rifles and pistols.

14. This was the Sharps four-barreled pistol, invented before the Civil War and fairly popular for many years. The Lancaster four-barreled guns and pistols previously mentioned were an English appropriation and improvement of the mechanism, accomplished by putting the revolving striker inside the lock and making it "double-action," the Sharps having required to be cocked by the thumb for each shot.

15. These were the French Lefauchaux revolvers, metallic cartridge and semimodernized adaptations of the old "pepperbox-pistol" idea, each chamber of the cylinders being an individual barrel, chambered and rifled. They were well made but are most curious-looking weapons, being exactly like a modern revolver from which the barrel portion has been knocked off, while as for accuracy or any idea of hitting anything—— !

16. These pistols were loaded by drawing the barrel straight forward by means of a trigger-guard under lever, when there was exposed a separate steel chamber forming part of the breech, this chamber being then loaded with loose powder and a ball and the barrel retracted and slid back into place over the chamber, thus seating the ball well up against the rear ends of the rifling. They were fired by a nipple and percussion cap, and a hammer actuated by a double or set trigger, and were among the most accurate target pistols ever produced. They are in use today (or were until recently) in the famous Gastinne-Renette target and dueling practice gallery in Paris, where the writer has often shot them.

Do our firearms-history gun-crank readers want still more questions along the same line? If so, how about this one: What do you know about your personal debt of gratitude to two American inventors by the names of James Paris Lee and Joseph Rider, for their parts in giving you your particular best-beloved guns that hang on your walls or stand in your gun cabinet at this day? Ever

hear of them? If not, as is all but certainly the case, you have missed knowing about two of the foremost American inventors who ever lived, both in their prime at the time when the National Rifle Association came into existence. Guns embodying their ideas have been made literally by the millions on millions in the past sixty years, possibly not less than 95 per cent of all the rifles made today containing devices of which they were the first to conceive. Only the master mind of the late John M. Browning ever surpassed them in breadth of practical mechanical ballistic knowledge; and despite the millions of Brownings that have been made and will be in years yet to come, it is doubtful whether more of his guns will ever be constructed than have been and will be produced of arms containing ideas that first germinated in the minds of these two Americans, James Paris Lee and Joseph Rider, in the late '60's and early '70's. Every rifleman alive today, soldier or civilian, ought to touch his hat brim in respectful salute at any mention of their names—names, as they are, of men but for whose genius perhaps not a single one of our superb, modern, high-power rifles would exist! Yet, alas! who knows, to say nothing of mentioning, their names today?

James Paris Lee was born in Scotland in 1831. At the age of four he emigrated with his father to Canada, settling in Ontario, where the father engaged in business at his trade of watchmaker and jeweler. Here the young James was early drawn by the swarming game of the neighborhood to a youthful passion for hunting and hunting arms. Following his father's trade and acquiring a high grade of mechanical ability, he appears to have removed to the United States at about the time of the Civil War, as during the '60's he is heard from as living in the little town of Stevens Point, Wis. It is believed that while still living in Canada he had patented (in 1856) a device for a repeating breech-loading rifle whose magazine was to be in the gunstock, slightly like the Evans rifle above mentioned. This was, however, still in the days of the paper cartridge, whose limitations rendered his invention of scant practicality. Another breech-loading rifle, also brought out during his Canadian residence, was more fortunate and attained some popularity among both Canadian and American hunters and woodsmen. (It is possible that these two guns, mentioned by various writers, may be the same weapon.) His first American patent for a gun mechanism was issued in 1862, and within the next ten years he secured rights for five more. His patent of 1862 was for a single-shot breech-loading rim-fire rifle mechanism which was made in quantity in Milwaukee, where the barrels were made by the old Allis Iron Works, the original of the Allis-Chalmers concern of today. Carbines with this action were used during the Civil War, being the only guns used in that conflict which were manufactured in the Middle West. (A vast number of barrels for these rifles being on hand, unused, at the close of the war, they were used for fencing-in part of the Allis foundry by being set in the ground close together, like a palisade.)

On his own account and in co-operation with others, Lee submitted rifles of various forms of breech-loading mechanisms to the United States War Department Boards of 1865, 1869, 1872, 1878, 1882, and to similar contemporary Ordnance Boards of the British Government. In the early '70's the Remington Company adopted the policy of employing able inventors to develop ideas for improving the firearms of the day, and Lee went into their service accordingly, remaining with them the rest of his life. Here he worked out the idea for *a bolt-action rifle using a box magazine underneath the bolt,* and this gun was *the parent of all modern military rifles,* and, of course, of all sporting rifles embodying the same ideas. As the Remington-Lee, it was adopted by several nations, including the army of China, where so many were used that the Remington catalogue was issued in a Chinese text. Its ideas were copied by the Mannlicher firm of Austria, and from them by the Mausers of Germany, while in England it became part of the Lee-Metford and Lee-Enfield guns—that is to say, of every British military rifle since the adoption of the bolt-action system. The Lee-Burton, Spencer - Lee, Lee - Hotchkiss, once known as the Winchester-Lee, all embodied his inventions; and the once-famous Lee Straight-Pull with its amazing and speedy little .236-caliber projectile, used in our Navy during the war with Spain, was entirely his production. On the basis of a record like this, could even an Einstein work out a set of figures which should represent anywhere near the number of guns that have been manufactured containing ideas that first took shape in the mind of James Paris Lee. American?

At the date when the National Rifle Association first saw the light of day, our other brilliant-minded American gun inventor was as busy as was Lee, while his special product was perhaps even more successful for the time, as peculiarly adapted to the black-powder, single-shot military rifles then being carried to a height of popularity and accuracy unprecedented anywhere. This was Rider's simple, practically two-part rolling-block breech action, soon and permanently known to the world as the "Remington" system.

It is a curious fact that in spite of Rider's works and their numbers, his success and fame, there still has existed in certain quarters some uncertainty—at least some confusion—as to his first name. The Remington official historical publication of some years ago, a small but very beautiful work, "A New Chapter In An Old Story," published in 1912, so superbly executed a booklet that it is a pity it was not made into a large work such as should do fuller justice to its subjects, calls him "John." So also C. W. Sawyer (Our Rifles, Vol. III of "Firearms In American History"), who twice calls him Joseph, and once John. Yet every single United States patent issued to him—and there were many—are in the name of Joseph Rider, and there are none to the name of John. The British gun historians, Lieutenants Ommundsen and Robinson, brilliant young men, both, alas, killed in the World War, also call him John, but appear simply to have copied the indicated errors in American works.

At any rate, Joseph Rider was a gun inventor of Newark, Ohio, where he certainly produced double-action percussion and rim-fire revolvers under a patent issued to him on August 17, 1858. Specimens of these latter arms bearing his name alone are in the Nunnemacher collection, made for him by the Remington factory, which probably led to his contact with that firm. He seems to have gone almost immediately into the Remington service, as within the year Remington pistols and revolvers began to appear bearing the dates of his patents, etc. By 1865 arms equipped with his devices were offered to the United States Board of that year, and in 1866 the first Government orders for these were received, in the form of 5,000 single-shot pistols of .50 caliber for the Navy. The Ordnance Board of 1869 ordered 10,000 Remington-Rider breech-loading muskets for the Navy, but to be manufactured at Springfield Armory, the Remington plant probably making the breech actions; and one year after the issue of these, the board reported that not one had ever been returned to the arsenal for repairs.

This was but the beginning of the enormous demand for guns with the Rider breech system. During the next few years Denmark ordered 42,000, Sweden 30,000, Porto Rico 10,000, Chile 12,000, Mexico 50,000, Egypt 55,000, Spanish colonies 85,000, Cuba 89,000, France 145,000, New York State 21,000, and a single New York firm sold 145,000. (An offered Turkish contract for 400,000 was refused because of the graft demanded by a certain individual for placing the order with the Remington firm.) The simple, practically foolproof mechanism, its strength and reliability, and the range and accuracy of the rifles, made the resultant orders sound like a roll call of the nations of the earth. Half the globe was equipped with Rider's guns, and only the arrival of the bolt-action magazine rifle seems to have prevented the eventual equipment of the rest.

The United States Army had, of course, the Springfield, invented by Erskine S. Allin, master armorer of Springfield Armory, but popularly nicknamed after the place of its origin. At first in .50 caliber, soon in the long-famous .45-70, improved models continued to be put out up to its supersession by the Krak-Jorgensen in 1892, after more than twenty years of service. Britain had at first the Snider, then the Martini-Henry; France first the Gras and then the Lebel; Germany the Mannlicher until 1898, and thereafter the Mauser.

Of all these foreign arms, how many were actually American in origin? We have noted the spread of the Remington-Rider. We

have seen that the Lancaster repeaters were only an improved Sharps action. Turkey adopted the American Peabody system; Switzerland the Peabody, presently altering it and calling the new gun the "Martini," under which name the British adopted it, adding the "Henry" improvement, a direct appropriation from the American Sharps, so that the supposedly truly British Martini-Henry arm is actually doubly of American origin. The British Snider was patented by Jacob Snider of the United States on October 15, 1867; and the Soper gun, which in 1870 and '71 stunned British military authorities by being fired 60 times a minute—it was a single-shot arm—and came very near being adopted for the British Army, was an appropriation of the invention of an American, W. W. Hubbell, in 1844. The Westley-Richards was a Peabody altered by having the hammer put inside the lock; the Swiss Vetterli was the Winchester with a bolt substituted for the under lever. And every later under-bolt box-magazine was an adoption or an alteration of James Paris Lee's original device.

At the period with which we are dealing, the early '70's, the first Winchester had but just been born, the interesting event itself occurring in 1870, with the transformation of the already-famous Henry rifle into the Winchester proper, forerunner of the millions of its line yet to be born. During the Civil War some 10,000 fortunate Northern soldiers —chiefly various State cavalry troops—had been armed with the Henry repeating rifle, made by the New Haven Arms Co. Of this company the president and principal owner was Mr. Oliver F. Winchester, of New Haven, and the plant superintendent was Tyler Henry, an expert mechanic from Windsor, Vt., inventor of the single weapon which the firm made. This was a 13-shot lever-action arm of .44 caliber, using rim-fire copper ammunition and in general not a little resembling modern Winchesters, but with bronze receiver, and whose tubular magazine underneath the barrel was filled at the muzzle end by compressing the coiled-wire magazine spring into a forward section of the magazine, and turning this aside, when the cartridges were dropped down the tube. While giving no great range or very high accuracy to its half-ounce bullet, it was still immensely superior in speed of fire and of reloading to any percussion arm, and troops equipped with it considered themselves undefeatable in action. The great defect of the piece being the manner of filling its magazine, in 1869 Mr. Winchester bought the Nelson King patents for a loading-gate in the side of the receiver, through which the magazine could be filled at its rear, and by 1873 there was worked out the famous model of that date, and the name and fame of Winchester repeaters swiftly went world-wide. Who can even think of the old West without thinking of a Winchester as in the hands of its frontiersmen, hunters, and Indian fighters? Very probably in the '70's the Winchester 1873 Model .44-40 accounted for more head of game and more Indians than all other arms of the times. Alas! in the hands of the fiercest warriors of the Sioux nation in the battle beside the Little Big Horn, several wagonloads of Henrys and Winchesters sold to the red men by unscrupulous traders proved themselves far more than a match for the single-shot Springfields of Custer's squadron of the Seventh Cavalry. With the early addition on successive models of a sliding cover for the formerly unclosed top ejection opening, iron for bronze in receiver and butt plate, longer barrels and magazines of sixteen-cartridge capacity, and the use of center-fire cartridges, it became the Winchester of history. To this day the Winchester Company preserves the trace of its origin in the stamp of the letter H on the head of all its rim-fire ammunition, the distinguishing mark of the original Henry cartridge.

Two more names must be mentioned as among the all-too-nearly-forgotten guns and gun inventors of the same period. These were the Sharps and Spencer rifles and their creators, the fame of both dating from the Civil War days. Sharps guns, whose popularity was unsurpassed on the Western plains by any other breech-loader, had the superiority of a simple and strong breech-loading arrangement consisting of a perpendicularly movable breech-block actuated by a trigger-guard finger-lever beneath. Adapted as early as 1861 to rim-fire, and later to center-fire ammunition, it became in the '70's the one choice of the professional buffalo hunter. Its popularity was such that the British Government even considered definitely adopting it for Her Majesty's troops, and equipped a regiment of cavalry with Sharps carbines for service in the field. A late model, the Sharps-Barchardt, hammerless and with firing pin and mainspring contained in the sliding breech block, used the most powerful black-powder cartridge ever produced in America, its long brass shell containing not less than 120 grains of powder, and the .45-caliber paper-patched bullet weighing 550 grains. Sharps guns continued in production for almost forty years, being discontinued only in 1881, when competition with the ever-increasingly popular repeating arms proved impossible.

The Spencer arms had just ceased to be made at our date of 1871, the plant having been bought and absorbed by the Winchester Company in 1870. Many of the rifles continued in use for a decade, however, and ammunition for them was made by the leading cartridge companies for more than twenty years thereafter. Christopher M. Spencer, the inventor, while hardly more than a youth, had patented in 1860 his repeating system, using the then new rim-fire ammunition, and within the next five years sold to the Government and to State troops over 100,000 muskets and carbines of .56 caliber, the new arm speedily earning the hearty curses of opposing Confederates, as "that damn new Yankee rifle that can be loaded up on Sunday and then fired all the week!" The magazine tube, holding seven cartridges, was in the stock, filled through a trap in the butt plate. Originally slow in loading, with one cartridge at a time, it was transformed in 1863 by the device of the Blakeslee loading tube, which filled the magazine with one motion, when the gun was capable of rivaling the Henry in speed of fire. In the early '80's Mr. Spencer re-entered the field of gun invention with his slide- or trombone-action repeating shotgun, which created an unprecedented sensation in the hunting world. Mr. Spencer survived to an advanced age, passing away only recently.

And now our story of the all-but-forgotten guns of the early '70's and their inventors must draw to its close. But it may well be asked: What was it that effected all this concentration of intellect on the part of inventors, technicians, and ballistic experts in the brief space of these few years on either side of 1870-1871, leading them to devote to the problems of firearms improvement such thought, ingenuity, and skill as no similar period in human history had ever seen before or has witnessed since? For it is a fact that from the spread of the use of gunpowder in the fourteenth century until today, no one period of similar length has ever produced as great developments in firearms invention and production as was going on contemporaneously with the birth of the National Rifle Association.

The answer is that it was the time of the world-wide change from the muzzle-loader, with its loose or paper-wrapped charge and its indispensable percussion cap, to the breech-loader, with its fixed ammunition and contained primer. These had been developing, it is true, for more than a score of years, and in even early and crude stages had demonstrated the superiority of the gas-tight cartridge case and its possibility of a tight-fitting bullet, with resultant range, accuracy, and energy completely transforming the world of arms. The use of these arms in the conflicts of the American Civil War had forced their results upon the attention of the civilized world, until in the last half of the decade of the '60's practically every nation held meetings of military boards to determine the arms best suited to their service, and rich rewards were the prizes of success in official competitions or in winning popular favor. The genius of America rose to the opportunity; and as, half a century later, the transportation demands of a new epoch in human progress produced in the New World motor cars of ever-improved efficiency, reliability, and economy, so in the Victorian and the American post-Civil-War periods the science of firearms attracted many of the keenest minds of the time to the development of its possibilities. The multitude of offered forms were soon winnowed by practical tests to a few varieties of strong, simple, breech actions, and to a caliber—usually about 45/100th of an inch—combining the utmost range, accuracy, and energy obtainable with the gunpowder of the time. Nor was it until smokeless explosives and the jacketed bullet

(Continued on page 49)

THE MUZZLE-LOADING RIFLE

(Continued from page 19)

the adaptation of the Berdan primer to be used with the muzzle-loading rifle. The false muzzle was altered to handle the composite bullet with the two-strip paper patch. This composite or combination bullet was made in two parts. The point was of an alloy, and much harder than the base. These two parts were swaged together so as not to twist apart when fired. The bullet was lengthened, requiring heavier charges of powder; the recoil was heavy, and machine rests were devised for use in firing the rifles in target work. A cross head was attached under the barrel near the muzzle, having a V-notch into which fitted a piece of metal attached to the shooting bench. The rear portion of the rest permitted the sliding of the rifle in recoil, and had fine screw adjustments for both windage and elevation. To fire, the rifleman seated himself to the left of the rifle, with his right hand against the butt and the first finger of the left hand on the trigger. When the rifle was fired the right hand took the recoil as the gun came back on the bench. The rifle was then loaded again, and returned to the original position.

After the Berdan primer came out, some of these rifles, to keep pace with the new development, were adapted to use it. Instead of the regular tube, or nipple, there was used a small tube of steel, the upper end being formed the same as the head of a brass cartridge shell, and receiving the primer. A cap was made, with a plunger, to screw down on the cylindrical portion. The hammer, striking the plunger, fired the primer, which communicated with the charge in the barrel through a small hole. This arrangement prevented any escape of the powder gases.

The false muzzle for loading the two-strip patch was formed in the same way as the false muzzle already in use, except that the center was bored out to a depth of three-quarters of the length of the bullet, and about three-quarters of an inch in diameter, this latter size depending upon the caliber of the bullet. The above dimensions are for a ball of .50 caliber and a length of 1½ inches. In this hole in the false muzzle another muzzle was placed that protruded an eighth of an inch beyond the original false muzzle. The bore at the outer end of this extra false muzzle was filed square, gradually tapering down to the other end. Two channels were cut across the outer end of this piece, at right angles to each other, and to a depth that brought their bottoms flush with the end of the original outer false muzzle (see illustrations top of page 19). Two pieces of bond paper, slightly oiled, were laid across each other in these two channels, and the bullet pressed into the square opening of the inner false muzzle, the channels guiding the paper strips, which made a perfect fold around the bullet. The starter was then used as usual to seat the bullet and center it in the bore.

A rifle of the above type is in the possession of the writer, and was made by Brockway, of Bellows Falls, Vt. It weighs 20 pounds, has a 30-inch barrel, including the false muzzle, which is constructed to use the two-strip paper patch; a full equipment of accessories; swages for two different sizes of bullets; moulds for the points and base of the composite bullet, and also for the solid ball, and a charger that indicates the amount of powder for the charge, which is 4 inches in the bore of the rifle. One swage forms a bullet that measures .520 at the base, .245 at the point, is 1½ inches in length, and weighs 700 grains. The other swage forms a bullet that measures .515 at the base, .240 at the point, is 1 9/16 inches in length, and weighs 680 grains. There are eight narrow lands in the rifling, which make 1¾ turns in the length of the barrel. The rifle is in perfect condition, and is as accurate as the day it was made. Ignition is by use of the Berdan primer. This rifle is equipped with a full-length telescope sight. A machine rest is also part of the equipment.

To those that are not familiar with the capabilities of these old rifles, the results of the following test of one may be of interest: Recently, at the invitation of the late Dr. Philip P. Quayle, of the Peters Cartridge Co., the writer made a trip to Kings Mills, Ohio, where the Peters plant is located, taking with him one of the finest target rifles in his collection, as Dr. Quayle had expressed a desire to measure the velocity of one of these old arms. The rifle tested was one of the finest, if not the finest specimen in existence, and was made by N. J. Whitmore, of Pottsdam, N. Y. It is in splendid, new condition, inside and out. Length of barrel, 31¾ inches over all, including false muzzle and patent breech. The grooves are cut on a gaining twist, beginning with one turn in 6 feet and ending with one turn in 3 feet 4 inches; bore diameter, .432; depth of grooves, .008; width of grooves, .103; width of lands, .69; weight of rifle, 16½ pounds. The bullets are of the flat-pointed picket type, with slightly rounded base, measuring .440 at the base, .740 in length, and weighing 225 grains. These bullets were formed of pure lead, hammered and then swaged, after which they were carefully weighed and only those used which were within 0.5 of a grain of the standard weight. Experiments were conducted in the laboratory with various powder charges, in which the velocity was carefully measured, and a charge of 64.7 grains of King's Semi-Smokeless, FFG granulation, was selected, giving a mean muzzle velocity of 1,638 feet per second. This rifle has a full-length telescope sight of about 12-power, adjustable for elevation by a finely cut screw, and a single set trigger. The starter will fit on the muzzle in only one position, insuring that each bullet will be centered exactly the same in the bore as every other one. Much depends upon the proper powder charge; and the method used in the laboratory for predetermining this, together with the accuracy of the forecast of its behavior before the rifle had fired a shot, seem incredible.

The rifle was taken to the range in its case, and there assembled. The bore was carefully wiped out, and one of the weighed charges of powder was poured into the muzzle, using a small wooden funnel that is part of the equipment. A felt wad 3/16 of an inch in thickness was seated on the powder. The bullet was then centered in a circular patch wet with saliva, placed in a depression in the muzzle provided for this purpose, the bullet-starter set in place, and the bullet forced into the bore, the bullet being seated down on the powder with a flat-ended ramrod. This flat-ended ramrod is used so that there will be no change in the axis of the bullet as fixed by the false muzzle and the starter. The false muzzle was then removed. Two shots were fired to warm the gun and settle the telescope in the mounts, after which 5 shots were fired for group, the bore being carefully cleaned after each shot; distance, 186 yards. This group measured: Extreme horizontal, 1⅛ inches; extreme vertical, ⅞ of an inch; mean radius, 7/16 of an inch. Every shot would have touched a 5-cent piece.

It is most probable that these muzzle-loading target rifles, equipped with telescope sight, set triggers, false muzzles, and bullet-starters, were the most accurate rifles ever made. Very few of the riflemen that were familiar with this type of rifle are living today, but three old photographs from a camera of forty-five years ago have preserved the pictures of some of the famous old riflemen who upheld the supremacy of the muzzle-loading target rifle to the very last.

GAME AND GUNS OF 1871

(Continued from page 30)

to shoot. We had millions of prairie grouse—not enough remain to make it worth while to hunt them. We had quail all the way from New Jersey to the Pacific, but not over one bird in the thousand is left today. We had so many waterfowl that a man's only work was to keep up his supply of ammunition and to procure a gun which would shoot fast enough. Automobiles are scouring America today to find the remaining ducks. We had millions of passenger pigeons, and not a single one is left!

If a man could hitch up a mule team today and drive across the virgin prairie, putting up a thousand grouse in a day and ten thousand ducks, he'd imagine that he must have suddenly died and gone to the heaven of the white hunter and the red. At that, man being what he is, and as unchanging as the "laws of the Medes and Persians," he'd very quickly ruin whatever heaven they might place him in; hence the wail of the old-timer for a day that is gone, for guns that are gone, for game that is gone. Shooters are too many, guns are too good, game is too scarce, and the mischief is about done. How many would have liked to sit in a blind with Joe Long, and, slowly loading a muzzle-loader, each kill his 75 ducks in an hour, rather than now sit in the same blind, with his live decoys around him, his automatic across his knees, and never see a single bird in a whole day? Some of us have either lived too late

or lived too long. But never mind. I am going to Arizona next fall, where I know I'll find quail; and so are all of you—going away off somewhere, sure of finding game at the end of the road.

RIFLES AT THE BIRTH OF THE N. R. A.

(Continued from page 24)

No. 44 Henry Pointed.—Adapted to the Henry or Winchester Carbine and Rifle.

No. 44 Henry Flat.—Adapted to the Henry or Winchester Carbine and Rifle.

No. 44 Long.—Adapted to F. Wesson's, Ballard's, and E. Allen & Co.'s Howard Rifles.

No. 44 Short.—Adapted to Pistols of .44 caliber.

No. 44 Howard ex. long.—Adapted to the Howard Rifle.

No. 46.—Adapted to Remington's S. & W. metallic cartridge army Revolver.

No. 46.—Adapted to Remington's army Carbine, and Ballard's Kentucky Rifle.

No. 46 Hammond.—Adapted to Hammond Carbine.

No. 56, calibre .46.—Adapted to Spencer's Sporting Rifle.

No. 56, calibre .50.—Adapted to Spencer's Military Carbine.

No. 56, calibre .52.—Adapted to Spencer's new model Military Rifle.

No. 56, calibre .56.—Adapted to Spencer's, Ballard's, and Joslyn's carbines.

No. 50, 60 grains.—Adapted to Peabody's Sporting Rifle.

No. 50, 6 grains.—Adapted to Peabody's Muskets.

No. 50, 70 grains.—Adapted to Remington's Muskets.

No. 42, CENTRAL FIRE.—Adapted to Russian Musket, manufactured by 'Colt's Patent Fire Arms Co.'

No. 43, same style as 42.—Adapted to Remington's Spanish Rifle.

No. 45, CENTRAL FIRE.—Adapted to Remington's Central Fire Rifle.

No. 50, CENTRAL FIRE.—Adapted to U. S. Breech-loading Muskets.

No. 58, CENTRAL FIRE.—Adapted to Remington's and Peabody's Transformed Springfield and Enfield Muskets."

In 1871 the largest dealers in small arms in New York City were Schuyler, Hartley & Graham, and their circular of that year lists the following rifles:

"MUZZLE-LOADING SMALL ARMS

Springfield rifle musket, caliber .58.
Enfield rifle musket, caliber .58.
And other low-price muzzle-loading muskets.
Fixed ammunition for the above.

BREECH-LOADING SMALL ARMS

	Caliber
Springfield rifle musket	.43, .50, .58
Remington rifle musket	.43, .50, .58
Peabody rifle musket	.43, .50, .58
Berdan rifle musket	.43
Robert's rifle musket	.50, .58
Brown rifle musket	.43, .50, .58
Van Choate rifle musket	.43, .50, .58
Ward Burton rifle musket	.43, .50, .58
Sharps rifle musket	.43, .50, .58
Ballard Kentucky rifle musket	.45
Tomes Joslyn rifle musket	.43, .50, .58
Green Barnekov rifle musket	.43, .50, .58
Whitney rifle musket	.43, .50, .58
Colt's rifle musket	.43, .50

REPEATING RIFLES

Winchester	Meigs
Spencer	Ward Burton
Scott & Triplet	

CARBINES

Remington	Spencer Repeating
Peabody	Smith & Hankins
Sharps	Ward Burton
Ballard	Starr Linen."

COLT'S ARMS IN THE '70'S

(Continued from page 43)

erosion, and to utilize the green shoots a factory for the manufacture of willow-ware was built, which was successfully operated for many years, until its destruction by fire in 1874.

This many-sided man had ideas in regard to advertising that would be considered quite modern at the present day, which has seen advertising developed into a fine art. When the East Armory was built in 1854 there was constructed above the roof over the entrance a beautiful dome, like those on Turkish mosques, painted a brilliant blue and ornamented with many gold stars, all surmounted by a Colt rampant covered with gold leaf. In those days there were no signs on any of the buildings, the travel was mostly by river steamer, and the Colt factory was the first object noted when approaching the city. All travelers gazing in wonder at the combination of Constantinople and Connecticut learned that here were made Colt revolving pistols, and were told the story of this wonderful invention. Although there were no signs on the office or shop, many of the doors were opened by a knob which was a casting of the old Navy 6 revolver handle. Many foreign orders were secured by presenting the potentate or his representative with an elaborately ornamented sample of the revolvers. Then again the Colt circulars of the early days bore slogans such as "Colt's Revolvers—the Pioneers of Civilization," and on the circulars was a powerful endorsement of the arms signed by such notables as Jefferson Davis, Lewis Cass, Zachary Taylor, Franklin Pierce, Martin Van Buren, W. H. Polk, Henry Wilson, and many officers of both the Army and Navy.

The most appealing characteristic of Colonel Colt was his human side, showing itself in his care for the workmen and their families. He arranged for target shoots, picnics, and excursions at frequent intervals; he built what would now be termed a recreation hall or community house, with facilities for lectures, sewing classes, dances, and neighborhood gatherings of all sorts; organized and equipped a company of militia, also a military band, the latter still existing under the name of Colt's Armory Band.

On the banks of the Connecticut all these years this industry has been active, turning out high-grade arms and furnishing employment to hundreds of workmen, all the result of the fertile brain and the persistency of one Yankee boy. Surely, the *good* that men do lives after them.

EARLY WINCHESTER RIFLES

(Continued from page 40)

cartridge. This rifle was later redesigned to handle the very heavy .50-110 cartridge, and was the heaviest repeating rifle yet to be produced. The Model 86, with its very superior breech mechanism and greatly increased lock strength, adapted for heavier ammunition than could be used in the Model 76, put this latter model out of the running, the manufacture of which was discontinued on the advent of the Model 86. In 1887 the company brought out a lever-action shotgun—another Browning invention—which was the first repeating breech-loading shotgun to use loaded shells. There had been numerous attempts at breech-loading shotguns, the most successful of which was the Roper revolving shotgun. This, however, would operate only with special steel shells, and could not handle the more modern brass or paper shells.

The next few years saw the beginning of the forearm-operating guns. The Model 90, .22-caliber rim-fire was produced in that year, the Model 93 shotgun came out in 1893, and at about the same time the Spencer forearm-action shotgun was produced.

This brings us to a very important turning point in the history of firearms, which is beyond the scope of this article—namely, the advent of smokeless powder. All of the arms hitherto listed were developed and built around black powder, and were designed to care for its slow-burning and relatively low-pressure characteristics. Chemistry had begun to work its way into the explosives field, and in 1893 or 1894 the first of the smokeless cartridges were put on the market, which were destined again to revolutionize the performance and design of the arms in which they were used.

The Winchester Models 66 and 73 were the result of a demand for such an arm for the winning of the West, these guns furnishing the meat for the men who built the Union Pacific Railroad, protection against bands of hostile Indians, and, together with the Colt Frontier, furnishing most of the law and order of those early days. It was due to this early history that the novelist has his hero reach for his "Winchester" instead of his "gun," and it furnished the foundation for a long line of notable guns which finally added officially another word to the English language, for the word "Winchester" appears in Webster's dictionary as "a type of gun," which last distinction is an honor few can boast of.

THE INVENTION OF THE CENTRAL-FIRE PRIMER

By MAJ. JEROME CLARK

PROBABLY few of our readers know about one of the most important inventions of the period of the early '70's—the invention of the central-fire primer. Most of us know that during the Civil War and for some years after all our cartridges were rim fire, with few exceptions. The Government .50-caliber Springfield, and also the .45, were central-fire, but they had no primer, as we know primers today. The firing pin simply made an indentation in the back of the cartridge case, over a little spot of fulminate enclosed in a pocket on the inside of the shell.

From 1865 to 1876 the Indians were giving the Army a great deal of trouble, making constant forays on the Union Pacific Railway, then in course of construction. Most of the Indians were armed with short, heavy muzzle-loading rifles of about .40 caliber, with half stock and patch box, which they obtained from the post traders in exchange for furs. In several engagements with troops and settlers about 1871 the Sioux captured a number of breech-loading rifles, mostly Springfields of the .50-caliber type. A strict order was issued not to sell any ammunition to them for breech-loading guns, and as far as is known the order was obeyed implicitly. However, whenever an Indian got a chance to pick up a fired cartridge case, he saved it, usually to cut up and hammer out into little ornaments to embellish his leggings or tobacco pouch.

Along about the latter part of '71 the troops had a brush with several parties of Sioux, and were surprised to find quite a number of them using Springfield rifles. The mystery was, where did they get their ammunition? I don't think the question was settled for quite a while, but after a future brush with them some of their empty cases were gathered up and were examined, and it was found that the Sioux had been reloading the empty cases that the soldiers had discarded. Here is how they solved the problem of the central-fire primer: Taking one of their ordinary percussion caps for their muzzle-loaders, they inserted in the open end of it a small piece of gravel. They then forced the cap into a hole punched in the center of the cartridge shell with a round nail or other pointed instrument. The piece of gravel served as an anvil under the firing pin to explode the fulminate, and the Indians had very few misfires. These cartridges caused a great deal of comment among Army officers, and specimens were sent to Washington.

Then came the invention by Colonel Berdan of the central-fire primer, with its own brass anvil fitted inside. However, the invention was basically of Sioux origin, and to these Indians we are indebted for starting the practice of reloading, probably a score of years before it would otherwise have been thought of.

FORGOTTEN GUNS OF EARLY '70'S

(Continued from page 46)

made the small-bore rifle at once more convenient, more powerful, and more accurate, that the grand old guns of the '70's were retired to the museum case and the curio cabinet. Theirs should be an honored desuetude, for they served the world nobly in their day, subjugating brute beasts, chastening the

> "New-caught, sullen peoples,
> Half-devil and half-child"

and teaching the nations that peace and sovereignty would always rest with those who gave their intellect and their courage to the defense of the things dearer to them than life itself.

STOLEN—COLT AUTOMATIC

A modified .45-caliber Colt automatic pistol, Model 1911, Springfield Armory No. 705779, stolen at Camp Grant, Ill., August 15, 1930. Members purchasing automatics are requested to be on the lookout for this pistol. Reward. Lieut. Charles W. Kossack, 208 E. Russell St., Barrington, Ill.

MONTANA CIVILIAN RIFLE ASSOCIATION MATCHES COMING

As we are about to go to press we receive notice that the 1931 annual outdoor .30-caliber matches of the Montana Civilian Rifle Association will be held at Fort Missoula, Mont., June 9 and 10. Write Wm. T. Parker, Roundup, Mont.

COMING EVENTS

National Rifle and Pistol Matches will be held at Camp Perry, Ohio, August 23 to September 13, inclusive; Small-Arms Firing School August 23 to 30; N. R. A. Matches August 31 to September 7; and National Matches September 9 to 13; all periods inclusive.

Tri-State Small-Bore Tournament (International Team Tryouts) will be held at Butler, Pa., May 27 to 30. Write to R. E. Louden, % Standard Steel Corporation, Butler, Pa.

Colorado Divisional International Team Tryouts will be held at Pueblo and Grand Junction, Colo., on May 10 (if weather conditions are unfavorable, the meet or meets will be postponed until May 17). Write H. H. Richardson, Secretary-Treasurer, Room 44, State Capitol Building, Denver, Colo.

Veterans of Foreign Wars Rifle and Pistol Club will hold a Memorial Day Tournament (International Team Tryouts) in Kansas City, Mo., on May 30. Address William Rincker, Secretary, V. of F. W. Rifle Club, Kansas City, Mo.

Missouri State Rifle and Pistol Association Matches (High-Power, Small-Bore, and Pistol), International Team Tryouts, will be held at Jefferson City, Mo., on May 16 and 17. Address E. E. Dittbrenner, Secretary, Jefferson City, Mo.

A Small-Bore Outdoor Rifle Tournament will be held at Primghar, Iowa, during the latter part of May. Ranges will be at 50 and 100 yards, and will include a Dewar Course Match for count in the International Team Tryout. Five per cent of total receipts will be donated to the Small-Bore Team Fund. For dates and particulars write to V. F. Hamer, Secretary, Primghar Rifle Club, Primghar, Iowa.

The Swiss Rifle Association of Hudson County, in Union City, N. J., has completed plans for the Fourth Annual 200-yard Outdoor Matches and Festival, which will be held at Hallbaur's Farm, Ladentown, N. Y., Sunday, June 14, Saturday, June 20, and Sunday, June 21. Information and programs will be forwarded upon request to all clubs or individuals. Write to J. J. Muntmer, Swiss Rifle Association of Hudson County, N. J., Inc., 457 West Street, Union City, N. J.

The Connecticut State Rifle Association will hold tryouts for the International Small-Bore Team Saturday afternoon, May 9, and all day Sunday, May 10, on the range of the Lufbury Rifle Club, off the Boston Post Road, about 2 miles south of Wallingford, Conn. This tryout is sanctioned by the National Rifle Association. For particulars write to E. E. Cook, Secretary, Connecticut State Rifle Association, Meriden, Conn.

The Roosevelt Rifle Club will hold the John Wallace Gillies Memorial Match at the New York State National Guard range at Camp Smith, Peekskill, N. Y., on Sunday, May 17. For particulars write to J. M. Hilborn, Treasurer, Roosevelt Rifle Club, 15 East 26th Street, New York, N. Y.

The Fifth Southwestern Pistol and Small-Bore Rifle Tournament will be held at Dallas, Tex., on May 23 and 24. There will be nine matches in the pistol section and nine small-bore matches in the rifle section. The tournament is sponsored by the Trinity Rifle Club, of Dallas, Tex., an affiliated club of the National Rifle Association. It has the sanction of the N. R. A. and will be run according to the N. R. A. rules and regulations.

The California State Matches will be held at San Luis Obispo (Calif.) the latter part of May.

Northwestern Rifle Association Matches will be held at Fort Missoula, Mont., June 4 to 8, inclusive. The schedule includes .30-caliber and .22-caliber rifle matches and pistol matches. Contact J. M. Underwood at Fort Missoula, Mont.

The Annual State Championship Rifle and Revolver Matches of the Oklahoma Rifle Association will be held at Okmulgee on the new Charles F. Barrett rifle range on June 13, 14, and 15. Write to Elmer C Croom, Secretary-Treasurer, Oklahoma Rifle Association, Okmulgee, Okla.

Kansas State Rifle Association Annual Matches—Junior and Senior Small-Bore Championships will be held on May 10; Pistol Championships and .30-Caliber Preliminaries, on May 11; and .30-Caliber State Championship Matches over Regular Army Course A on May 12. All at the National Range at Fort Riley, Kans. Contact Dr. James C. Lehane, Junction City, Kans.

Montana Civilian Rifle Association Matches, open to civilians and all branches of the service, will be held during May. Entries close May 16. Address the association headquarters at Fort Missoula, Mont.

A Dewar tryout will be staged by the Gastonia Rifle Club on May 20 and 21, at Gastonia, N. C. Write H. M. Van Sleen, same place.

Springfield Sporter with Western Mount and Zeiss Scope.

Distinctive Leadership

WESTERN MOUNTS are absolutely reliable in holding zero adjustment. Lightest in weight—strongest made. Unaffected by recoil. Lowest possible position on rifle affords natural alignment for the eye for quick and accurate sighting. These important features have given Western Mounts distinctive leadership. Men who make their living with the rifle such as Trappers and U. S. Government Hunters are almost unanimous in using these dependable mounts. Receiver sight base can be left on the 54 Winchester and 30S Remington. ¶ Price of Mounts, **$20.00 to $25.00**. Attached without charge. Zeiss and Hensoldt scopes supplied. Descriptive literature on request. *Also ask for literature on new receiver sights.*

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THE STOEGER, .22-Cal. ATTACHMENT

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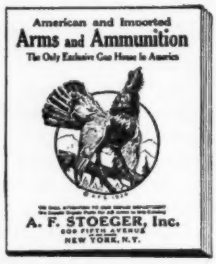

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IN THE April issue of THE AMERICAN RIFLEMAN Major J. S. Hatcher, probably the greatest living authority on pistols, makes the above statement concerning the H. & R. USRA Model Single Shot Pistol.

We hope every man interested in shooting will read Major Hatcher's article, for in it he describes and shows the value of the features which have made this H. & R. the choice of the finest shots in the world.

Experts and beginners alike report that with this pistol they are able to make higher scores than they can produce with any other gun.

Pistol shooting with such a gun is the most fascinating sport, it challenges your ability to hold, sight and squeeze, but due to the lightning-fast action, super-accurate barrel, proper balance and correct grip, you can make rapid progress and do excellent shooting in far less time than with any other pistol. Never before has it been possible for a manufacturer to guarantee an arm to give a purchaser higher scores, but that is the guarantee we make with every H. & R. Single Shot.

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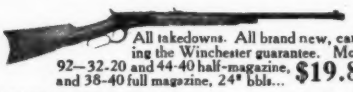

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"The cleaning of firearms is a subject of great interest to the shooting fraternity. . . . I have always disliked the water-cleaning method. . . . It was with the idea of producing something easier to use, equally effective, and that would not in itself cause rust, that Fiendoil was developed. I wish to say here that I am in no way connected with its development, and furthermore that I was, at first, very skeptical in regard to the claims made for it. . . . .

". . . I started my experiments by cleaning the barrel thoroughly in order to start with proper conditions, and also examined it carefully so that I would be able to note any change in its condition after the experiments had been completed.

"I first fired twenty primers through the barrel . . . with the muzzle of the carbine held close to a saw blade that I had cleaned and polished. . . . I poured some Fiendoil over the primer deposits on the saw blade and took the carbine to my house where I used Fiendoil as directed. I then stood the carbine in a corner of the room near an open window. . . . I left the carbine stand two days before wiping out. A considerable amount of black, oily residue came out on the patch, but the barrel wiped out clean and there was no evidence of corrosion. I repeated this experiment five or six times, leaving the gun stand three and four days before cleaning the second time. . . . I left the saw blade with a dry cloth and left it in the garage. No additional oil has been applied and no rust has developed. After finishing the experiments with the carbine I gave it a fresh application of oil and left it standing for about two months, examining the bore frequently. It remained in perfect condition.

"I also used this oil for cleaning my service rifle during a period of three weeks, firing one day per week, and it gave excellent results. . . .

"This oil covers metal surfaces with a film that is very difficult to wipe off, and forms an excellent rust preventive. It does not run off or evaporate quickly."

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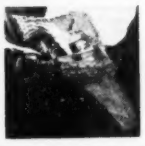

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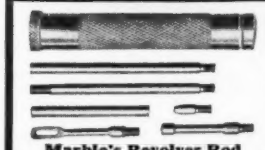

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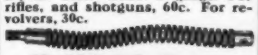

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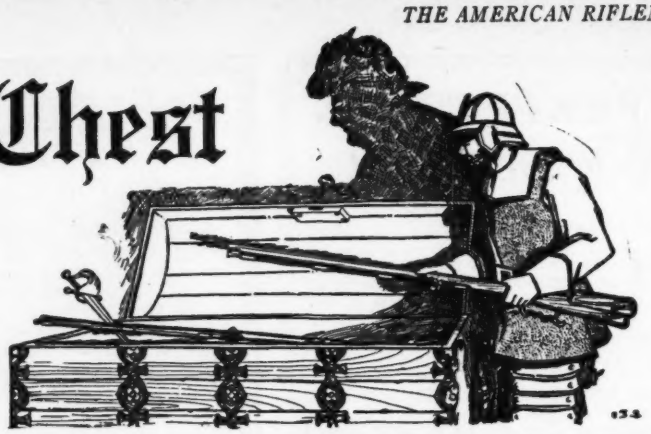

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.44-40 COLT N. S., 5½-inch or 7½-inch, blue, good condition, $20 each. F. V. Allen, Cross River, N. Y. 5-31

PREWAR S. & W. .22-32, factory condition. Call front sight, Heiser holster, $24; Colt .45 automatic, late model, almost new, $24; money orders only. David Armitage, 1234 Wagner Ave., Logan, Philadelphia, Pa. 5-31

MARLIN Model 410 repeating shotgun, lever action, new, $25; Marlin Model 39 rifle, new, never shot, $20; Mississippi Valley Arms Co. 12-gauge double hammerless, new, $15; Steyer rifle, pistol-grip stock, a fine rifle, 6.5 x 55 mm., $15; H. & R. Premier .22, good as new, $5. A. Ilstrup, % State Teachers College, St. Cloud, Minn. 5-31

COLT .38 Super-Automatic pistol, guaranteed new inside and out, no scratches, 300 cartridges, hollow point, quick-draw holster and cleaning rod, all for $38. S. R. McAlary, P. O. Box 1358, San Antonio, Tex. 5-31

NOW IS THE TIME to buy that 3-barrel gun you have always wanted. We are closing out our sample guns at bargain prices. Send stamp for list. Baker & Kimball, 37 South St., Boston, Mass. 5-31

.22 CROSMAN REPEATING RIFLE and .410 Iver Johnson single shotgun, both like new. WANT—Winchester 52, Savage N. R. A., or Springfield 1903 Service. Must be A1. E. F. Hawes, 272 W. Exchange, Providence, R. I. 5-31

BRAND-NEW REMINGTON automatic riot gun, 12-gauge 20-inch, cylinder perfect, good "brush" gun, $30; Remington .41 double Derringer, blue, new condition, 175 Kleanbore shells, $12; good S. & W. single-action Russian .44, perfect 5-inch barrel, tight, no rust, bluing badly worn, loading tool with mould, $15; Colt S. A. Army, .45 7½-inch, one-piece wood grip, new condition except very slight holster wear at muzzle, $17.50; very good Colt Navy .36 cap-and-ball, no rust, with double-cavity mould, $8; very good U. S. Army flintlock .54 pistol made by R. Johnson, Middletown, Conn., in 1840, barrel pitted, finish worn, otherwise perfect condition; spare flints and mould, $17.50. No checks. C. O. D. $1. Stamp. H. R. Wollard, Burke, Idaho. 5-31

STOCK-CHECKERING TOOLS, $5 per set. Includes following tools: Three spacing tools, fine, medium and coarse, double-end V-cutter, bent Swiss file, straightedge; full instructions. Special Border tool, $1.50 extra; tools made of finest grade tool steel; satisfaction guaranteed or money refunded. R. J. Snyder, Pine Castle, Fla. 5-31

RETIRING from firearms line. List of fine used guns for sale. Address Box 62, Keokuk, Iowa. 5-31

SAVAGE MODEL 28A, 12-gauge, hammerless pump gun, 32-inch barrel, full choke, brand new, $35. Ralph Drake, Mankato, Kans. 5-31

COLT .22 WOODSMAN model, new, never fired, in factory grease, cost $32, will sell for $20; no trades. L. R. Gebo, Rouses Point, N. Y. 5-31

TRAP GUNS—single-barrel Baker, Ithaca, Parker; Western WRF noncorrosive, $6.50 M.; Western Colt Super .38, $24 M.; used .22 Colt Automatic with silencer attached; slightly used Winchester 52 beaver-tail forearm and speed lock, $35; Parker-Hale sound-moderators and recoil-reducers for rifles, single-shot and automatic pistols, and single-barrel shotguns not exceeding .410 gauge. Jim Craton's, 221 Harrison St., Davenport, Iowa. 5-31

CARTRIDGE BELTS—Genuine, Mills woven belts, brand new, state caliber wanted, special, $1 each. Hudson, 52 Warren St., New York, N. Y. 5-31

.45 AUTO. CARTRIDGES, 1928 stock (copper), $2 per 100; .38 Colt auto. pistol, military model, with leather holster and 200 factory cartridges, $25; No. 3 .45 Colt Ideal tool, D. A. chamber, shell-expander, muzzle-sizer, kake-kutter and 454190 mould, new condition, $7.50; .32-40 Winchester 1894 tool and mould, $3. WANT—.25, .32, and .38 auto. pistol; .38 police revolver, telescope sight, .22 S. & W. single-shot pistol. David C. McNeill, 33 Beckford St., Beverly, Mass. 5-31

"OUR RIFLES," Vol. III, Sawyer, $4. "Pistols and Revolvers," Hatcher, $3. "Amateur Gunsmithing," Whelen, $1. New condition. Smith & Wesson M. P., .38-caliber 6-inch barrel, fixed sight, blued, $4.50, perfect. John M. Perley, Arlington Heights, Mass. 5-31

ANTIQUE FIREARMS—My lists are illustrated and instructive. Hundreds of types. List for 10 cents, stamps. F. Theodore Dexter, 910 Jefferson, Topeka, Kans. 10-31

REMINGTON 17A, .28 full, bore new, outside slightly case-worn, rod, case, Mills belt, 35 shells, $47.50; Stevens .22, 15-60 good, 200 loads, 120 empties; Ideal tool, mould, $70; Colt .32-20 Army Special, good, box shells, $20; money order $5 balance. C. O. D. subject to examination. Frank Schott, Box 988, Pawhuska, Okla. 5-31

COLT ARMY SPECIAL .38, 5-inch barrel, nickel-plated, pearl grips, steer head, ruby eyes, same as new, $30. Pat Barr, New Martinsville, W. Va. 5-31

SMITH & WESSON English Military Model 455 Eley, 6½-inch blued, fine condition, $23.75. Hudson Sporting Goods, 52 Warren St., New York, N. Y. 5-31

CANADIAN LANDS SEIZED AND SOLD FOR TAXES—$65 buys 25 acres camp site; $99 buys 60 acres hunting, fishing, trapping; $117 buys 40 acres farm; $216 buys 96 acres mile lake front; $441 buys 170 acres sea front; $1,620 buys 900 acres enclosing lake. Our 14th annual list just issued in the form of a 20-page booklet describes the above and many other choice properties offered at tax-sale prices. The amount quoted is the full price asked; perfect title, no mortgage. Beautifully situated hunting and fishing camps where there is real sport; summer-cottage sites; heavily wooded acreages in Muskoka, Highlands of Ontario, and the New North; also farms in Ontario, New Brunswick, Quebec, Prairie Provinces, and British Columbia. Now is the time to invest in Canada's minerals, forests, and farms. Small monthly payments if desired. Don't delay. Write today for free booklet with full explanation. Tax Sale Service, Room 625, 72 Queen St., W., Toronto, Canada. 5-31

TWO 1886 WINCHESTERS octagon barrels, very good condition, .40-82, 22-inch, $7; .40-65, 26-inch, selected pistol grip and forearm, $17; Sharps carbine, perfect, $6; Sharps hammer barrels, 8 pounds, .45, 3¼, $7; 6-pound .40-90 B. N., some pits, $5; new solid-head empty .45, 3¼, $1 each; new solid-head loaded .40-90 B. N., 12 cents. Sharps hammer-action parts. E. B. Spalding, Box 1057, Jerome, Ariz. 5-31

.38 COLT Military auto., new, factory finish, $22.50. A. W. Bruce, Traverse City, Mich. 5-31

WONDERFUL COLLECTION of target guns: .30-06 Swedish International Team rifle, complete, new and super-accurate, falling-block action, at half price, $100; Pope-Smith & Wesson .38 target revolver, 8-inch barrel, $40; .32-44 Russian Model S. & W. revolver, rebored to .38 Special by Milburn, $30; .30-06 Windhammer Springfield Sporter, very fine, $50; Pope-Smith & Wesson .22 pistol, single action, $40; single-action .22 S. & W. pistol for .22 short cartridge, $25; Fecker scope 1⅛ diameter, 10-power, with extra eye piece, gives 14-power, with mounts complete, $45; very rare single-action S. & W. pistol with 10-inch .38 barrel, $35; finest Remington pistol, .22 caliber, by Wilburn, $40. Carl W. Wahrer, Eldorado, Calif. 5-31

UNEMPLOYMENT SACRIFICE—Model 54 N. R. A. Winchester, .30-06, guaranteed never fired, $46. Richard Boyce, 7027 1st Ave., N. W., Seattle, Wash. 5-31

NEW REMINGTON 20-gauge automatic, $45; .22 Colt Woodsman, perfect, bluing worn, $25. Robert Warfel, 3328 Kenyon Ave., Baltimore, Md. 5-31

.32-20 WINCHESTER, Model 53, stainless-steel barrel, nearly new condition, Lyman peep, $21; .32 S. & W. hammerless, $12. H. L. H., 32 Stuart Place, Manhasset, N. Y. 5-31

PEARL, STAG, OR IVORY grips made special for any type of gun. Prices on request. Hudson Sporting Goods, 52 Warren St., New York, N. Y. 5-31

HART SPEED ACTION still the best for Winchester 52, $20; fitted to present 52 rifle with speed lock, $22.50. Ship only your bolt complete, sear, trigger, trigger guard and trigger plate for fitting. Hart Arms Co., 2185 E. 2nd St., Cleveland, Ohio. 5-31

16-GAUGE WINCHESTER 1897 full-choke take-down repeater, brand new, new case, box shells, $35. Send money order. N. P. Frayseth, Milan, Minn. 5-31

REMINGTON 8A, caliber .35 auto., good, $30; Colt .32-20 single-action, slight holster wear, inside perfect, $18; .45 Colt auto., fair, $15; Model 55 Winchester .30-30 rifle, takedown, new condition, $28; Power amplifier, using two 245 tubes; also one 226, one 280, for public address, system with tubes, $50. P. Petersen, 507 N. Front, Rock Springs, Wyo. 5-31

WALTHER .22 automatic target pistol, new condition, barrel spotless, gold bead Patridge type sights, $30; Winchester 12-gauge autoloading, 28-inch full, full-grain leather case, good condition throughout, $20. Leslie Lindahl, Central City, Nebr. 5-31

RIFLES—.45-90's, .30-06's, .30-40's, 8-mm. .22's, .25 rim fire, .32 rim fire, .30-30's, .32-40's, .38-40's, .44-40's. Crosman, Newton 256, Winchester, Remington .35's, Springfield star-gauge, Marlins, Standard Arms, Savage. List 10 cents. N. P. Frayseth, Milan, Minn. 5-31

CROFT SHOOTING COAT, size 40, like new, used only twice, $3.50. G. E. Winters, 2308 Johnson St. N. E., Minneapolis, Minn. 5-31

RARE BINOCULAR, field glass, telescope bargains, slightly used, $1.75 up; 8X prism binoculars, $9; Busch, Du Maurier, Lemaire, Colmont, Megaphos, Schutz, etc., 3- to 34-power, world's largest assortment, catalogue free. Du Maurier Co., 195A, Elmira, N. Y. 5-31

OPTICAL AIRPLANE machine-gun sights, Air Service surplus, new in original cases, 5 ground lenses, size 2 x 24, cost over $50, $4 postpaid, money order, or cash. Western Salvage Co., 648 Market, San Diego, Calif. 5-31

CHECKERING TOOLS—Improved set by J. R. Whiteman, complete for straight or fancy checkering, $5. Hart Arms Company, 2185 E. 2nd St., Cleveland, Ohio. 5-31

NEW No. 15 Heddon bamboo casting rod with extra tip and aluminum case, 5-foot, cost $35, my price $20. Arthur Radinske, 211 Wisconsin St., Eau Claire, Wis. 5-31

BEST CASH OFFER—Remington .24 automatic, .22 short, Lyman sights, new Leedy trap drum set, description for stamp. WANT—Crosman air rifle. Leslie Vanatta, Covington, Ohio. 5-31

WINCHESTER 12 trap, 30-inch barrel, ventilated rib extension forearm, Hawkins pad, ivory sight, perfect inside, gun-crank outside, cost $175, sell $100. Emory Willson, Staunton, Va. 5-31

SIDE ARMS—Colt, Smith & Wesson, Luger, Mauser, Remington, Stevens, Reising, Iver Johnson, Ortgies. List, 10 cents. N. P. Frayseth, Milan, Minn. 5-31

HORN FORE END lumps, $1; ribbed horned butt plates, 85 cents; horn grip caps, 50 cents. D. Owens, Box 2303, Tucson, Ariz. 7-31

$4.50 SINGLE-BARREL PISTOL, wood handle, old and rare, large selection guns, rifles, pistols, Government radio, binoculars, field glasses, and musical instruments. Buy, sell, and exchange. Write your wants. Weil's Curiosity Shop, 20 South Second St., Philadelphia, Pa. 5-31

"MODERN GUNSMITHING," by Baker, $3.50; "Tracks and Tracking," by Brunner, 75 cents; "Camping and Woodcraft," by Kephart, $1.75; all new. Geo. W. Dainton, 280 Wall St., Meriden, Conn. 5-31

LONG SLENDER CAP-LOCK KENTUCKIES, match and squirrel rifles, $25 to $50. Cap, ball revolvers. Charles Pickel, Jr., Kingston, Tenn. 5-31

PARKER PH, 12 gauge, 28-inch, Lyman sights, fired 75 times, absolutely spotless, $55; Cooke (English) 12½X spotting scope, $7; Bausch & Lomb 6 x 30 binocular, $15; Springfield service, new barrel and receiver, never fired, $24. Carleton Meyer, 5002 Stenton Ave., Philadelphia, Pa. 5-31

SAVAGE N. R. A. with Lyman 438 scope, both new, $35, or $18 each; Marlin .39, Lyman sights, factory condition, trade for 5A scope. Claude Roderick, Fort Scott, Kans. 5-31

TRAP GUNS—Remington expert, Parker, Marlin, Winchester, Ithaca, Smith, Lefever, Charles Daly. List, 10 cents. N. P. Frayseth, Milan, Minn. 5-31

PEERLESS handcuffs, new, $8; S. & W. Olympic 10-inch, $18; S. & W. .38 Special R. B., 5-inch, $16; S. & W. .22-32, new, $22.50; Colt S. A. .38-40, 4¾-inch, fine, $22.50; Colt N. S. target, 7-inch, .44-40, $25; Colt S. A. .32-20, frame and action, $10; AMERICAN RIFLEMAN complete 1921 to date. Lemaire binoculars 8X, good, $15. E. T. Nash, 31 Abbott, Valley Falls, R. I. 5-31

SMITH & WESSON K22, $32.25; Colt Ace, $32.50; Colt Woodsman, $27.50; all new and guaranteed. Sam Lowery, Box 112, Eagle Rock, Calif. 5-31

.32 SMITH & WESSON double action, $7; .32 French folding trigger, $4.50; .22 Johnson 9-shot target, new, $7.25; Johnson 1837 percussion horse pistol, $12; .38 Harrington-Richardson, new, $4.50; .45 Colt action musket, $3; mounted ox horns, $4.25; knapsack, $1.50. James O. Johnson, Southington, Conn. 5-31

BIG-BORE 8- and 10-gauge doubles, lever-action repeaters, singles, Scott, Daly, Parkers, Winchesters, Greeners, Lefevers, Ithacas, Belgians, Smith, Remingtons, Davenports, Francotte Moore. Factory and handloaded shells. Crow-shooting now starting—a big bore should double your bag. List, 10 cents. N. P. Frayseth, Milan, Minn. 5-31

COLT S. A. .32-20, perfect, extra barrel, empties, loading tool, Crosman pneumatic .22 perfect, $5; Winchester, Model 06, .22, $5. Shaw, 4 Green St., Brattleboro, Vt. 5-31

OFFICERS' MODEL TARGET, .38 special 6-inch barrel, special ivory front sight, bead, new and perfect with Niles case, $35. Merle Fairley, Houlton, Me. 5-31

N. R. A. TYPE WINCHESTER 54 .30-06, shot 20 rounds, sta-clean, like new, $50. No trades. F. Goerschner, 547 Lake Ave., Lyndhurst, N. J. 5-31

.44 SPECIAL SMITH & WESSON target model, stag grips, perfect new condition, 6½ barrel, blued finish, new holster, new Ideal No. 3 tool, Bond double-cavity moulds, 244 grain, 50 cartridges, lot of empties $40. J. E. Wellington, Box 223, Wellsville, Ohio. 5-31

WINCHESTER 54 .30-06 receiver peep sight, in factory grease, $34; Savage Sporter .25-20, No. 42 receiver sight, shot 50 times, Kleanbore, $17. Eyes not good. Sam Koopman, 127 Cutler, Grand Rapids, Mich. 5-31

.45 COLT NEW SERVICE 7½-inch outfit, $25; .32-20 P. P. Special, 5-inch, $15; .38 Colt Army 6-inch, $11; .32-20 Army Special 6-inch, $15; Haenel 28R air pistol, $10; .44-40 S. & W. revolver, $7.50; Ideal shell-resizing die, .44-40, $1.25. L. E. Clark, Lewiston, Me. 5-31

COLT O. M. T., .22 caliber, gold bead sight, $25; Colt Woodsman, perfect, with special holster and extra magazine, $22.50; Colt S. A. .38-40, $12.50; Luger .30, perfect, $20; Hammond Bulldog, factory new, made in 1864, $17.50. Locke, % Travelers Insurance Co., Omaha, Nebr. 5-31

IMPROVED all-metal indoor target and bullet-catcher, 12 x 15 inches, foolproof, for home or any place, particulars upon request, will stand rifle bullets. Also 1,000 various antique arms at low prices and as represented. List for stamp. Address Antiques, 1427 Chase Ave., Chicago, Ill. 5-31

NEW BARGAIN LIST—Target and hunting rifles, equipment, ammunition, 2-cent stamp appreciated. Charles Kelly, 30 Alaric St., West Roxbury, Mass. 5-31

BRAND-NEW GUNS—.38 Colt Official Police revolver, $25; 1897 Winchesters, $24; 52 Winchester speed-lock, beaver-tail forearm, $34. WANT—Krag cartridges case lots. D. O. Amstutz, Ransom, Kans. 5-31

NEILLY patented never-slip sling-keeper, it fits the standard sling, used by many expert rifle shots, satisfaction guaranteed; price, 75 cents each. D. H. Neilly, Box 442, R. F. D. No. 2, Bradford, Pa. 5-31

THOROUGHBRED Springer spaniel puppies from best registered hunting strains, will hunt next fall, natural hunters and retrievers. Calvin Hosmer, Jr., Sharon, Mass. 5-31

BALLARD by Marlin, .38-55, 30-inch heavy barrel, perfect, $22; Winchester S. S. .22 L. R., takedown, accurate, $15. F. F. Tubbs, Stanton, Mich. 5-31

COLT .38 SUPER-SHOT one-box Staynless, $29; 5A Winchester scope and mounts, like new, $30; Winchester 1890, .22 W. R. F. peep sight, case, barrel poor, $8.50; .38 S. W. Winchester loading tool, $2.50. Bud Wickersham, 170 Valley, San Francisco, Calif. 5-31

.45 COLT automatic, new condition, imported Asiatic buffalo horn handles, bluing perfect, satisfaction guaranteed, $24. M. P. Buehler, 697 Vernon St., Oakland, Calif. 5-31

STRONG AND DURABLE polished corrugated cast-aluminum butt plates for rifles or shotguns, 1⅝ x 5⅜, $1.50 each. Your money back if not entirely satisfied. A. Greendale, R. F. D. No. 651, Richmond, Calif. 5-31

SAMPLE LOT assorted sizes, eight new airplane turnbuckles with bronze barrels, and eight clevises, $1 postpaid. Western Salvage Co., 648 Market St., San Diego, Calif. 5-31

NIEDNER-KRAG .30-40, heavy 26-inch Niedner target barrel, was new 1898 action, plain Sporter stock, good outside, perfect inside, Lyman 48 rear, ivory front, shot very little, using only Lubaloy bullets, $45. John W. Caldwell, R. F. D. No. 2, Afton, Iowa. 5-31

REMINGTON No. 24 automatic, .22 L. R., factory condition, $16; B. & M. bullet-sizer, .38 Special, new, $2; Ideal No. 360271, 150-grain bullets, sized and lubricated, 65 cents per 100, f. o. b. E. Wires, 576 Harriet, Flint, Mich. 5-31

NEW-TYPE SPEED LOCK, Model 52, in factory grease, absolutely never used, $36.50; Winchester trap gun, ventilated rib, in fine condition, $60; brand-new model 54, .30-06, with new type stock, $35. WANT—Perfect Camp Perry or Woodsman or other fine up-to-date guns for cash or trade. Fred Anderson, 251 Main St., Hackensack, N. J. 5-31

.30-06 AND KRAG CARTRIDGES, case lots. WANT—.44 S. & W. Special target and .32-20 loading tools. R. H. Smith, 506 Dewey St., Harvard, Ill. 5-31

SPRINGFIELD FLINT, Ball, Palmer, Ballard, Hall, Sharps, Jenks, carbines; Spencer sporting .56-46, percussion pistols, Remington 50, Schofield, Marlin 1881, Bridesburg, Lee, Henry, Maynard sporting, etc. Stamp. F. G. Dilts, Logan, Ohio. 5-31

WINCHESTER 52 speed lock nearly new, $25; Winchester .22 automatic, new barrel, $15; Browning 12 automatic, two barrels, 30-inch full, 28-inch modified, new condition, $50; Springfield Circassian-walnut stock, details on application, $30; Winchester 52 stock, $3.50. E. Deshayes, Dragon, Utah. 5-31

180 ROUNDS .270 Winchester, old-type primer, Winchester make, $10.80; Modern-Bond straight-line reloading tool .30-06, and Krag with .311 bullet-sizer, $9. Warren Beckrink, 201 Buffalo St., Jamestown, N. Y. 5-31

NEW OFFICERS' MODEL Colt, .22 left hand, fancy Heiser holster, $35; B. S. A., perfect, 48 rear, 17A front, nickel-steel barrel, scope blocks, prone butt stock, $35. WANT—Fecker ¾-inch 8X scope and mounts, new N. M. Springfield; or J. Floam, 11 S. Exeter St., Baltimore, Md. 5-31

WINCHESTER 12-gauge 1897, fine, $25; Winchester 12-gauge 1912, new, $35; Remington 12-gauge, Model 29, new, $35; Winchester .25-20, 92, takedown, new, $23. WANT—Copy Baker's "Modern Gunsmithing," also Springfield service rifle. H. C. Moore, Prairie du Sac, Wis. 5-31

NO. 44½ STEVENS, single set, .28-30, 28-inch, No. 2 barrel, few pits, action fine, regular sights, $12. No. 45 Stevens (No. 44½), double set, .22 long rifle, 28-inch, No. 2 barrel, excellent shape, Lyman target sights, accurate, $35. No. 47 Stevens (No. 44), .22 long rifle, 26-inch, No. 2 barrel, like new condition, Lyman peep and front sights, accurate, $15. No. 44 Stevens, .25-20 S. S., 26-inch, No. 2 barrel, very good condition, iron sights, $8. Heavy Winchester S. S. action, case-hardened, fair finish, good stock, Winchester type double set, flat mainspring, $10. Light Winchester S. S. action, refinished, good condition, single set, stock, flat mainspring, $4. Heavy Winchester S. S. action, refinished, good condition, single set, stock, flat mainspring, $7. No. 44½ Stevens action, refinished, good condition, stock, $7. No. 44½ Stevens double set action, good finish, good condition, stock, $10. Two No. 44 Stevens actions, good finish, good condition, stock, each, $4. .22 long rifle Stevens barrel, No. 44½, 26-inch, No. 2, fine condition, fore end, no sights, $5. Two .32-40 Stevens barrels, No. 44½, 28-inch, Nos. 2 and 4, slightly pitted, else fine, fore ends, no sights, each, $4.50. .32-40 Stevens barrel, No. 44½, 27-inch, No. 3, good, fore end, no sights, $4. .32-40 Stevens barrel, No. 44, 30-inch, No. 3, slightly pitted, fore end, no sights, $3. .32-40 Winchester S. S. barrel, 29-inch, No. 4, full octagon, fine condition, fore end, tapped for scope, no sights, $8. Heavy .28-30 Stevens No. 44 barrel, 32-inch, No. 4, good to reline, $3. No. 47 Stevens butt plate, good, $1. For reboring or relining: Four No. 44½ Stevens, two No. 44 Stevens, and two Winchester S. S. barrels, each $1.50. Stamp brings information. Everything as stated. No. C. O. D. Alfred Loetscher, Box 397, Sibley, Iowa. 5-31

A PRECISION INSTRUMENT—Fine Stevens-Pope, Schuetzen model, with Swiss butt and cheek piece, special Pope barrel, .22 L. R. Stevens telescope sight, set triggers, a super-accurate rifle in crank condition, cost $125, first check for $60 takes it. M. E. Thompson, Port Allegany, Pa. 5-31

WINCHESTER 95 carbine .30-40, fine, $22.50; fancy Colt hammer, 10 gauge, some pits, $18. A. F. Myers, 636 W. 24th, Ogden, Utah. 5-31

BEAUTIFUL GRAINED SPRINGFIELD sporting stock $70 value, new, $35; very fine new Krag stock, $22.50; Springfield rifle, fine, special custom stock, ivory front, cost $76, sell $43. E. D. Bray, Fremont, Iowa. 5-31

.32-44 S. & W. RELOADING TOOLS, $3; complete file *Stock and Steel*, a collector's magazine, $6.25; catalogue U. S. C. Co. collection, $4.50; pair B. & S. .48-caliber rifled target pistols, rare, $37; .32 Iver Johnson hammerless, $5; "Simeon North, First U. S. Official Pistol Contractor," rare, $9.50; Genuine Indian tanned deerskin, $5; .44 Remington percussion Army revolver, $8.50; Colt .36 percussion Navy revolver, $15; Greene oval-bore under-hammer military rifle, $14; U. S. Hall b. 1 carbine 1839, with bayonet, $9; Sharps buffalo rifle .45-2⅞, 16½ pounds, $35; other duplicates. J. C. Harvey, 971 Commonwealth Ave., Boston, Mass. 5-31

WINCHESTER TOURNAMENT, $45; Winchester standard, $32.50; Remington standard, $30; Marlin hammer trap, $30; Colt 1917, .45, $13.50; Hampden wrist watch, $5; Illinois gold watch, $10. Frank Wilkinson, 82 Monticello, Buffalo, N. Y. 5-31

STEVENS IDEAL, .25 rim fire, Lyman rear and gold bead, 850 Kleanbore cartridges, $20; Marble Game-Getter, 18-inch, $14. Both good condition, perfect inside. Fred Thornton, 213 Summit St., Montgomery, Ala. 5-31

SALE — NO TRADES — Colt Woodsman pistol. Brand new, never used, $26, just as shipped from factory, in factory grease. L. J. Hathaway, % THE AMERICAN RIFLEMAN.

LORD BURY SPOTTING TELESCOPE, brand new, 25-, 30-, 35-power, weight 2½ pounds, four draws, length extented 31-inch, closed 10½-inch, regular leather case, price $40, regular price $50. H. P. Allen, Room 900, 200 Devonshire St., Boston, Mass. 5-31

SELL OR TRADE

95 MODEL WINCHESTER .30-40, $19.50; '01 Model Winchester, 10-gauge, $21.50; S. A. A. Colts, new, $24.50; Bisley Colts, fine, $35; New Service target, new, $43.50; plain and fancy cowboy outfits: saddles, bridles, boots, spurs. WANT—.30-30 and .32 Winchester Special. Rifles priced right. The United Store, Collbran, Colo. 5-31

PERFECT-SHAPE .22 HORNET, Springfield barrel, Winchester S. S. action, beaver-tail fore end, field scope and tang sight, loading tools, 100 empties, sale $45; trade for perfect late Springfield .22 or .52 with speed lock and semi-beaver fore end. C. E. Bonnell, 760½ Commerce St., Tacoma, Wash. 5-31

WINCHESTER 54, .30-06, $25; Remington 12, .22 slide action, new barrel $15; S. & W. S. S. pistol, Olympic .22 L. R., perfect, $20; S. & W. .22 target revolver. WANT—Winchester 52 or Lyman 48T. O. H. Schwanger, Middletown, Pa. 5-31

WINCHESTER 12-gauge No. 12 pump, 30-inch full, solid matted rib, two Lyman ivory sights, standard stock, Hawkins pad, fine leather case, all in new condition. Bargain for cash, or trade for single-trap 32-inch with pistol-grip stock, in fine condition. Box 428, Longview, Wash. 5-31

.25 REMINGTON AUTOLOADER A-No. 1 for Super-Sporter, .250-caliber barrel, must be like new, or $35. John Lottes, Cody, Wyo. 5-31

LYMAN 103 for Winchester 52, new, $6; Ballard barrel, octagon .40-70, perfect inside, shells, mould, $8; fine specimen mule-deer head, $50; or trade for Springfield Sporter. J. R. Buhmiller, Eureka, Mont. 5-31

SPORTING Springfield, $40; drill press and ¼ H. P. motor, $15. WANT—Service rifle. C. Stewart, Mounted Route, Wurtumburg, Ellwood City, Pa. 5-31

EXTRA-LARGE mountain-sheep head, a perfect specimen, mounted last December by Jonas Bros., Denver. Will trade for Sedgley Springfield if perfect, or will sell for $65. John S. Conway, Norton, Kans. 5-31

STEVENS 44½, like new, .32-40, weight 10½ pounds; also Winchester 12, Model 12 shotgun, new. J. H. Bissell, Morton, N. Y. 5-31

TWO NICE BALLARDS, set triggers, .22 L. R.: 5A scope with case, $25; one new Lyman 5A scope, $35; Lyman 48M, $7; Ideal muzzle die .25-35, 75 cents; 4 x 5 lens f4.5, new, $35; ICS Elec. Eng. course for best offer. WANT—Winchester 52 stock; D. C. M. Sporter stock; Springfield action; Encyclopedia. J. R. Buhmiller, Eureka, Mont. 5-31

SAVAGE .32-20 Sporter, Lyman 42 receiver sight, crank condition in and out, $16. WANT—.45 ACP Colt, .380 or .22 S. S. pistol. C. Gene D'Oench, 709 University Club Bldg., St. Louis, Mo. 5-31

3,000 N. R. A. HOLLOW POINT, lot $19.50; handmade rawhide laced large holster, $5.50. WANT—Reisings, either model; .38 Colt pocket auto., good condition, priced cheap; shoulder holsters for both. Warnken, Adrian, Mo. 5-31

HAVE '95 Winchester .30-40 Army, fine used condition, $25; Savage N. R. A. Match, .22, new condition, $16.50. WANT—New Service .44-40 or .45 Colt 7½-inch; Colt Woodsman; 5A scope with mounts. George A. Deming, North Windham, Conn. 5-31

IVER JOHNSON .32 revolver; Goerz 6½-inch Dagor lens, Beevac vacuum cleaner; Schneider 6-inch f3.5 lens, 9¼-inch Protar lens; also other lenses and photo goods. WANT—Fox Super 12-gauge. W. Quackenbush, Independence, Wis. 5-31

KRAG barrel, action and bolt complete, $4.50; Springfield service stock, $2.25; Krag bolt complete, $1.50; Krag carbine, like new, $7; Atwater-Kent table radio, Model 35, with tubes, $12; case 5,000 .22 shorts, noncorrosive, $12. WANT—Hunting scope, spotting scope, Winchester .22 musket, 7.65 Luger; or make me an offer. Ray Brown, Westbury, N. Y. 5-31

SAXOPHONE, Conn C Soprano, silver and gold, low pitch, good condition, with case, cost $115, worth $65. WANT—Springfield Sporter, Browning 16, portable typewriter. Ralph Drake, Mankato, Kans. 5-31

.22-CALIBER WINCHESTER S. S. Hornet, $20; three .30-06 Mausers, $20 each; .30-40 Russian, Lyman sight, $12; .30-40 Winchester 95, $20; .38 Special Colt P. P., $15; .45 Colt auto., $15; 12-gauge 12 Winchester, $25; 16-gauge Ithaca, $25; 16-gauge L. C. Smith, $20; 12-gauge Fox, $24. WANT—Springfield .30-06 actions or complete guns, scopes; or what have you? E. L. Gorenflo, Gunsmith, 1803 State, Erie, Pa. 5-31

.410 DOUBLE, A1, $15; .38 pocket auto., A1, $18; Treemer scale, $5; .250 Savage, 1899G, good, $25; .22 Colt auto. and holster, A1, $25. WANT—Colt S. A. .38 or .44 Special 7½, A1; Ideal sizer .311; .358, .30-40 S. S. Winchester. Write for and send description. Fred H. White, Fall Brook, Calif. 5-31

LEFEVER single-trap gun, .38-40 single-action Colt, both in factory condition, very cheap for cash, or will trade. WANT—.22, .32-20, or .44 Special target revolver, double 12-gauge; or what have you? McCaslin, Centralia, Kans. 5-31

S. & W. .38 HAMMERLESS, slightly holster worn, inside good, holster, $20; Iver Johnson, double 16-28, perfect, $25. Trade No. 2 Brownie camera, serviceable, for .44-40 or .45 revolver with ruined barrel. Action must be fair. Walter Kingsbury, R. F. D. No. 4, Shickshinny, Pa. 5-31

SPRINGFIELD Model 1903, handmade stock, B. & M. bolt-sleeve rear sight, perfect condition, .30 caliber, $35; or will trade for Winchester 52 like condition. R. A. Davidson, 915 3rd St., Las Vegas, N. Mex. 5-31

WESTERN FIELD .16-30 double-barrel shotgun, perfect, $12.50; Fulton Special, .12-32, $17.50; Ranger .20-28, perfect, $12.50; Fox-Sterlingworth, .12-30, as new, $22.50; Lefever, .16-28, $17.50; Crescent Arms Co., .12-30, $12.30; Crescent Arms Co. .20-26, $12.50; all above guns are perfect and have full and modified choke barrels; .410 Folsom single-barrel, perfect inside, outside shows wear, $4; Stevens .12 single, perfect, $5; Browning .12-30, ribbed barrel, modified choke, like new, $37.50; Browning .16-30, ribbed barrel, perfect, full choke, $42.50; Remington .12-30 automatic, perfect, $35; Winchester pigeon grade, 20-gauge, two ventilated ribbed barrels, leather case, perfect condition, $115; Smith crown grade .20-28, ventilated ribbed barrels, single trigger, beaver fore end, like new, leather case, $100; Winchester pigeon grade, .12-30 full, ventilated rib, extension fore end, leather case, $115; Winchester trap grade, .12-30, ventilated rib, extension fore end, fine condition, $65; Browning, No. 3 grade, two ventilated barrels, full and cylinder, $125; improved cylinder barrel for Remington 12-gauge automatic, $10; Smith & Wesson .22 single-shot, Olympic model pistol, fine condition, $14; Luger pistol, 1911 model, 9-mm. caliber, perfect, $18; Colt .38 official police, 6-inch barrel, perfect, $18; Colt .45 U. S. Army model, fine, $12.50; Colt .45 single-action, nickel-plated, pearl handles, barrel slightly rough, otherwise perfect; Winchester Model 94 rifle, .25-35 caliber, perfect except slight wear on frame, $17.50; Winchester Model 94 carbine, .30-30, like new, $17.50; Savage .22-caliber, Model 28, fine condition, $10; Marlin Model 39, .22 caliber, $12.50; Savage Model 99A, .250-3,000 caliber, $22.50; Smith crown grade double shotgun, .12-30, both full, ventilated rib, large fore end, single trigger, pistol-grip stock, 1½ x 2½ x 14½, $115; Smith ideal grade, .12-30, full and modified, single trigger, ejectors, perfect, $55; Lefever double, .12-30, full and improved cylinder, factory condition, $21; Remington pump, Model 29, .12-30, checkered grip and fore end, new condition, $31.50; Winchester .16-28, full, new condition, leather case, $32; Remington .22, Model 12C, new condition, $13.50; Remington .22, Model 12C, brand new, factory grease, $14.50; Remington Model 25, .25-20, case, and 140 shells, $22; Fournier binoculars, 8 x 32, retails at $45, sell for $25; Colemont special binoculars, 8 x 34, retails at $32.50, perfect, $22; Smith & Wesson military and police revolver, .38 caliber, 6-inch barrel, perfect, $22; Smith & Wesson military and police, .32-20, nickeled, new, $22; Remington 20-gauge automatic shotgun 28-inch barrel, new condition, $42.50; eight boxes .250-3,000 Savage shells, $7.75; Savage .30-30, 99G, rifle, with Savage plush-lined leather case, belt, exactly like new, $35; Springfield Sporter, .30-06, fine condition, $25. Will ship any of the above C. O. D. subject to examination, on receipt of $2. James M. Douglas, 4433 N. Robey St., Chicago, Ill 5-31

A5 TELESCOPE complete with mounts and sole-leather case, fine condition, $27; Bisley-Colt .44-40, 7½-inch, good, $25; bullet mould .44-40, fine, $2.50; new Krag rifle, especially selected with extra bolt complete, Model 1902 sight, $15; Winchester Model 92 carbine, .38-40, fine, $13.50; Stevens .35 pistol. 410 gauge, 12-inch, very fine, $9; Bisley .44-40 5½, barrel somewhat pitted, $18. WANT—Mattern's "Handloading Ammunition." D. H. Ryan, 669 S. Barksdale St., Memphis, Tenn. 5-31

REMINGTON .25 rimless slide-action rifle, Lyman sights, tang rear, ivory bead, outside shows wear, action perfect, barrel worn but serviceable, $20; Savage Model 29, .22 L. R., slide-action takedown repeater. Lyman sights: Tang rear, folding leaf, ivory bead, bluing slightly worn, barrel and action perfect, $18. WANT—Fairbanks powder scale. Don Spender, 137 Woodland Ave., Waterbury, Conn. 5-31

.32-20 5-INCH BARREL Smith & Wesson, .45 5½-inch Colt S. A. A. WANT—.22 Smith & Wesson revolver; gunsmithing modern and C. & B. revolvers rebuilt. Barrel fitted .002 or less from cylinder. Stocks fitted to pistols. Chas. C. Milliron, Dayton, Pa. 5-31

TRADE

PEPPER B-Flat trombone, leather case. WANT—Either Colt .22, Savage .29 rifle, Granger fly rod, good condition. Dewey, Deerfield, Wis. 5-31

.38 COLT MILITARY for .22 Woodsman; .45-60 reloading tools for .45-70 tools. R. C. Acebedo, Star Route, Lemoore, Calif. 5-31

LET'S SWAP! Whatcha got? Whatdye want? Trial two dimes. Swapper-Sportsman, 5125 12th, Detroit, Mich. 5-31

SAVAGE .303 lever action, Lyman flexible peep rear sight and ivory front sight, fine condition, for Colt single-action Army .45, in equal condition. W. A. Belt, Jr., 1032 Spitzer Bldg., Toledo, Ohio. 5-31

HAVE .30-06 Service issued .30-40 Krag ammunition. WANT—Spotting scope, hunting scope, or Lyman 5A. R. S. Foster, 142 N. Lafayette, Bremerton, Wash. 5-31

WILL TRADE—A $61 credit, which can be applied on any course in the International Correspondence Schools for a telescope sight, .30-06 rifle, .22 Colt automatic; or what have you? Must be in A1 condition. Millard Doughton, Salem, Oreg. 5-31

COLT OFFICERS' MODEL 38, Camp Perry, both new in felt-lined case. Trade for binoculars, Zeiss binoctar, or other good marine glass and pay difference. F. W. Swanberg, St. Charles, Ill. 5-31

CLARINET Bb, Buffet model, cost $110, in fine shape and good instrument. WANT—Winchester 54, N. R. A. model, .270 caliber, or Springfield Sporter with Star barrel, either must be in fine accurate condition. Del Luper, Tangent, Oreg. 5-31

MIRAKEL 7X binoculars, fine, for Colt .45 automatic or .38 automatic or Woodsman. Earle Adams, 1724 S. Ashland, Chicago, Ill. 5-31

.32-40 WINCHESTER-SCHUETZEN target, wonderful condition, beautiful rifle; write for full description. Trade for Springfield Sporter, must be good. C. R. Stuedeman, 1825 N. 2nd St., Clinton, Iowa. 5-31

EVENRUDE MOTOR, perfect condition, trade for Colt .44 Special N. S. target or S. & W. .44 Special target; .22 Colt P. P. target, fine shape, trade for H. & R. .22 single-shot pistol U. S. R. A. model. Model 29 Savage, .22 caliber, Lyman peep and gold bead sights, like new, trade for Colt O. P. 6-inch .38 caliber or S. & W. .38 Special M. & P. 6-inch barrel. Claude Chapman, Brookings, S. Dak. 5-31

ELECTRIC MOTORS, Maytag engines, cream-separators, radios, water-scope, wading-pants, shotgun and rifle loading tools. WANT—Guns, outboard motors. N. P. Frayseth, Milan, Minn. 5-31

WANTED

WANT—8-gauge new empty shotgun shells, either brass or paper. J. T. Maxwell, 1140 Medical Arts Bldg., Omaha, Nebr. 5-31

WANT — Winchester single-shot action, heavy type, plain trigger and pistol grip or complete rifle. S. M. Leonard, Dell, Mont. 5-31

WANT — Winchester single-shot, Ballard and Stevens Ideal rifles, and actions. Give complete description and lowest price. E. F. Pope, Woodville, Tex. 5-31

WANT—Books on modern rifles and hunting. Also Springfield .22 in excellent shape, cheap. State price. Frank Deanovic, 1218 Ansel Rd., Cleveland, Ohio. 6-31

WANT—Two practically new Savage rifles, Models 99 G or B, .300; condition must be perfect. W. Kohl, 820 Bailey Ave., Elizabeth, N. J. 5-31

WANT—Colt .45 S. A., 5½-inch barrel; also Colt S. A. with 7½-inch barrel, any caliber, outside condition good, inside immaterial. James Schroeder, Y. M. C. A., Appleton, Wis. 5-31

WANT—Colt D. A.; also C. & B. F. C. Dieterle, 2701 N. Talman Ave., Chicago, Ill. 5-31

WE ARE endeavoring to create a library for the National Rifle Association. Rare books upon subjects pertaining to the rifle, pistol, revolver, and shotgun are desired. If you have one or more books which you are willing to donate for this purpose, write us, giving name of book and author.

WANTED—Colt or equivalent American cap-and-ball, muzzle-loading revolvers stamped as made by Samuel Colt Patent Firearms Mfg. Co., Paterson, N. J., or by other American makers. If you have any, write giving full descriptions, markings, condition of finish, and price. Will pay cash or trade for other antique arms, if preferred. McMurdo Silver, 6401 West 65th St., Chicago, Ill.

GIFTS of rifles, pistols and revolvers are desired for display at the office of the National Rifle Association. History of the arm should be given as duplicates are not wanted. The assistance of all shooters is solicited in order to make this collection the most unique in the country.

WANT—Remington .35-caliber pump gun; state condition and price; will pay cash. Ralph Gordon, Happy Camp, Calif. 5-31

WANT—16- or 20-gauge Marlin, visible hammer shotgun, prewar preferred, in good condition. J. F. Zeiss, 4465 Townsend Ave., Detroit, Mich. 5-31

WANT—Winchester 54 action .30-06 or .270 caliber, in good condition. E. L. Heidbreder, Hotel Snyderhof, Kansas City, Mo. 5-31

WANT—Flat-top Frontier and Bisley Colts, Winchesters, 1866 rifle, 1873, 1876, 1892 muskets, and old model double shotgun. J. C. Harvey, 971 Commonwealth Ave., Boston, Mass. 5-31

WANT—Whitney Navy C. & B. revolver in new condition. Old copies *Outdoor Life* and "Outer's Book." C. A. Carpenter, Box 787, Hobbs, N. Mex. 5-31

WANT—10,000 Krags and 10,000 rifles, shotguns and revolvers of any make. Will accept the above as part payment on any American gun except Browning. Will not allow more than $5 on any gun. I allow $2 for Krag rifles, $4 for Krag carbines regardless of condition. This offer is only good on guns selling for $30 or more. Sam Lowery, Box 112, Eagle Rock, Calif. 5-31

WANT—New .38 S. & W. safety hammerless, preferably nickel, 3¼-inch. State exact condition and price. T. K. Fisher, Concord, N. H. 5-31

WANT—Sharps .45 rifle, Winchester S. S. and Sharps-Borchardt actions. Buy or trade for other arms. Henry Nonnemaker, R. F. D. No. 2, Bethlehem, Pa. 5-31

WANT—Catalogues of the early type Smith & Wesson R. F. as issued by the factory; state price and condition. Albert H. Rogers, 730 Walnut St., Gadsden, Ala. 5-31

WANT—52 Winchester brand-new condition, 5A telescope to fit same, .22 Winchester musket. Charles E. Lorentz, Sadsburyville, Pa. 5-31

WANT—Stock .22 automatic pistol, sport model, made by Franz Stock Factory, Berlin, Germany, must be in perfect condition. Leslie Lindahl, Central City, Nebr. 5-31

MISCELLANEOUS

SEND YOUR OLD GLASS to us for estimate on new Hensoldt rifle scopes and binoculars. G. & H. mounts. We maintain an expert repair department. Vernon Optical Co., Box 14, Mt. Vernon, N. Y. 5-31

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KRAG AND SPRINGFIELD RIFLES completely remodeled to sporting type with new barrel band and sling swivel and complete oil finish for $6.50. Receiver sights attached at list price. S. H. Fryer, Jr., 209 Whittier St., Vandergrift, Pa. 6-31

GUNSMITHING—Restocking of rifles a specialty. Emil J. Blade, 2518 S. Carlisle St., Philadelphia, Pa. 5-31

GUNS RESTOCKED or metal parts finely engraved, game scenes, gold inlaid monograms, etc. John W. Harrison, Gold Hill, Oreg. 5-31

GUN ENGRAVING of the highest art in relief, bas-relief, gold inlay, etc. In any style of design to suit the discriminating sportsman and collector. Estimates on request. R. J. Kornbrath, 42 Asylum St., Hartford, Conn. 5-31

GUNSMITHING — Restocking specialty. Prices reasonable. William Bailey, Lisbon, N. H. 5-31

JAMES V. HOWE, 1592 Crawford Road, Cleveland, Ohio, the Howe of Griffin & Howe, Inc., restocking, repairs, testing, special experimental work, development of patents and models. Circular on request. tf

OUTDOOR LIFE AND RECREATION combines in a single magazine the most popular features of two great publications—*Outdoor Life* and *Outdoor Recreation*. Published at Denver by John A. McGuire, the new combination is continuing the traditions of *Outdoor Life* and offering an even larger proportion of stories and articles on big-game hunting and rifle-shooting. The great Gun and Ammunition department is divided between Colonel Whelen, in charge of the Rifle and Pistol section, and Chas. Askins, on the shotgun. The new magazine is considerably larger than either of the two publications which have been combined, and the increased space is permitting a far wider variety of gun and hunting material in every issue. The price of the new publication is twenty-five cents a copy, $2.50 a year—the lowest price at which any outdoor magazine of equal size can be secured. As a special get-acquainted offer to readers of THE AMERICAN RIFLEMAN, a trial five issues will be sent for $1. *Outdoor Life and Recreation*, 1802 Curtis St., Denver, Colo. tf

CANADA, THE RIFLEMAN'S PARADISE: Its true picture is given you in the pages of *Rod and Gun In Canada*, Canada's national outdoor-life magazine. Each issue packed with honest-to-goodness yarns of hunting and fishing in the Dominion, which has it second to none. Real stories that real men can appreciate and a gun department edited by C. S. Landis, unexcelled. A sample copy is yours for the asking. Write *Rod and Gun*, Gazette Bldg., Montreal, Canada. tf

OLD ARMS RESTORED, repaired. Have done work for some of the best-known collectors and dealers for the past 15 years. The Hinckley Machine Works, Hinckley, Ill. tf

KRAG, SPRINGFIELD, RUSSIAN rifles, remodeled, cut off barrel, put on front sight, stock completely remodeled, $6.50. Satisfaction guaranteed. S. H. Fryer, Jr., 209 Whittier, Vandergrift, Pa. 5-31

SPECIALIZING SPRINGFIELD SPORTERS. R. G. Owen, formerly of Sauquoit, N. Y., now located at 222 S. Scott St., Tucson, Ariz. Will also handle to order high-grade European guns of all types. 6-31

BIG-GAME HUNTER—Arrange now for that big fall hunt you have planned and dreamed about so long. Stone sheep, deer, moose, goat, caribou, and then there's black, grizzly and brown bear; black and gray wolf. A hunter's paradise—the Musqua River district. W. Kiely, Hudson Hope, British Columbia, Canada. 7-31

GOOD GUNSMITHING—Reasonable prices, restocking, rebluing, set triggers, adjustments, repairs. Write H. M. Watson, 1512 Gale Ave., Nashville, Tenn. 5-31

KRAG, SPRINGFIELD, Russian rifle-owners. Will raise comb, put on pistol grip, modify forearm, fit new butt plate, and refinish stock. Workmanship guaranteed, price $6. Send 10 cents for picture of remodeled gun. Seasoned Pennsylvania-walnut gunstock blanks, $2; shields for mounting deer heads, etc., $4.50. A. E. Warner & Son, 2512 Pleasant Valley Ave., Altoona, Pa. 5-31

FINEST KRAG AND SPRINGFIELD SPORTING stocks made to your own specifications, completely fitted and finished. Stocks are of select-grade walnut and are supplied with cheek piece, horn grip cap, butt plate, barrel band, and Whelen detachable swivels with sling eyes, $25. Stocks supplied with butt plate only, $16. Only the finest materials used. Write for price list. John Herold, Muchmore Road, Rye, N. Y. 5-31

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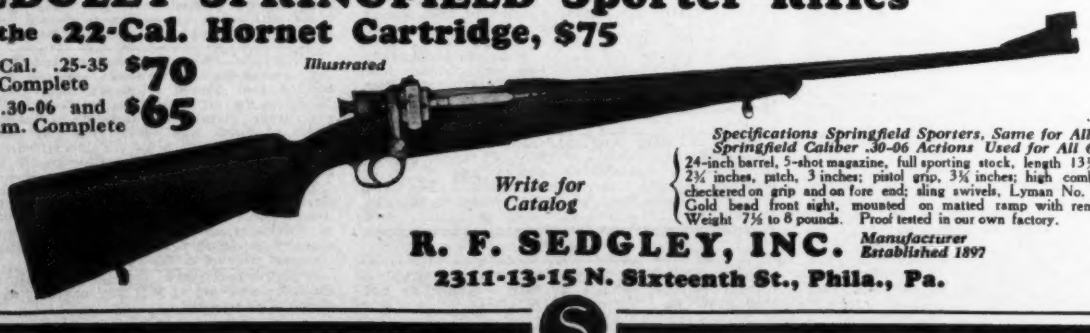
for the .22-Cal. Hornet Cartridge, $75

Also Cal. .25-35 Complete $70
And .30-06 and 7-mm. Complete $65



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Specifications Springfield Sporters, Same for All Calibers Springfield Caliber .30-06 Actions Used for All Calibers.

24-inch barrel, 5-shot magazine, full sporting stock, length 13½ inches; drop, 2½ inches, pitch, 3 inches; pistol grip, 3¼ inches; high comb; handsomely checkered on grip and on fore end; sling swivels, Lyman No. 48 rear sight. Gold bead front sight, mounted on matted ramp with removable guard. Weight 7½ to 8 pounds. Proof tested in our own factory.

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Makes the Long Range Super-X .22 a Better Game Cartridge

THE Shock Tests pictured below show the greater stopping power of Western's new .22-caliber, long-range Super-X cartridges.

Bullet Shock combined with sufficient penetration gives STOPPING POWER. The photograph on the left shows the result of two bullets fired into a block of wood. The upper one is a Super-X L. R. .22. Note how it expanded after penetrating the surface, tearing a larger hole, due to its terrific speed and the special composition lead which is used. The Super-X bullet is *designed* to do that—to expend its energy *within* the object struck.

The other bullet, an ordinary .22 L. R., penetrated without expanding, giving excessive penetration that means *wasted energy*. Such a bullet often goes clear through an animal without stopping it.

Super-X long range .22's have the power and range to stop small game at surprising distances. Fifty per cent more power and 26 per cent higher speed. Their increased killing power is made possible, without dangerous increase in pressure, by an entirely new powder principle—Western's new Double Action powder. It gives much flatter trajectory, a more accurate, more powerful .22 that can be used with safety in any standard rifle.

In a recent magazine article Capt. Chas. Askins said: "I have fired two or three hundred Super-X long rifle cartridges and not a rim has split. Not a cartridge failed to fire, not one showed overpressure, not a thing in the world went wrong with one of them."

The louder, sharper CRACK of Super-X .22's when fired makes them sound more like high power ammunition. Loaded with Non-Corrosive priming, they keep your rifle bore free from rust and corrosion. The gleaming nickel-plated shells and greaseless golden Lubaloy-coated bullets make them the finest cartridges to look at that you will ever hope to see. Made in .22 Short, .22 Long, .22 Long Rifle and .22 W. R. F. sizes—with solid or hollow point bullets. We would like to send you a free leaflet completely describing Super-X .22's and Western's new Double Action powder.

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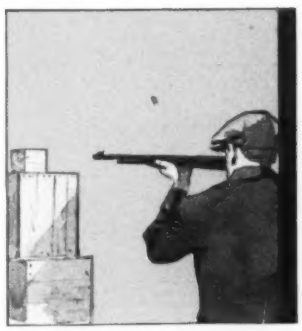
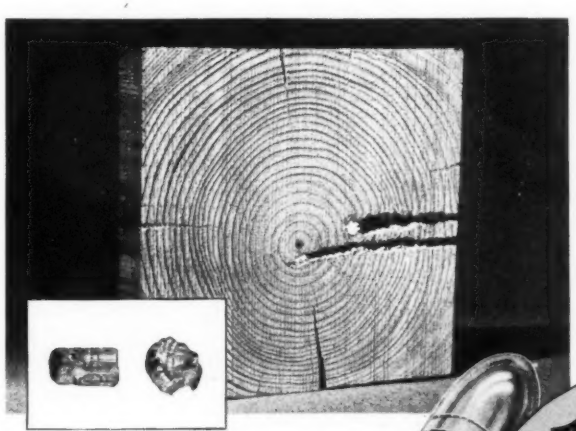


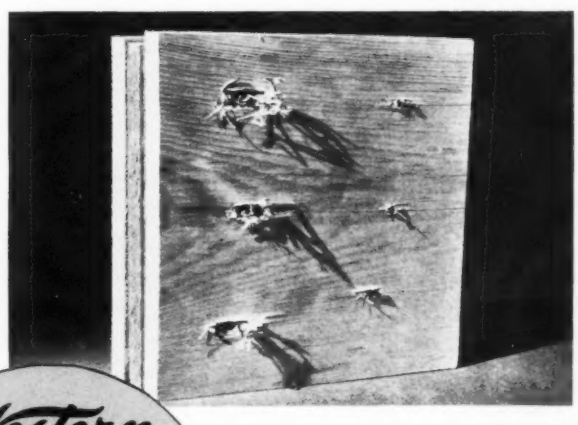
DOUBLE ACTION POWDER

Energy applied to a *moving* object drives it forward faster than the same amount of energy applied when the object is stationary. That is the principle of Double Action Powder. It first starts the bullet on its way. The pressure behind it is then rapidly increased, driving the moving bullet forward with much greater speed and energy.

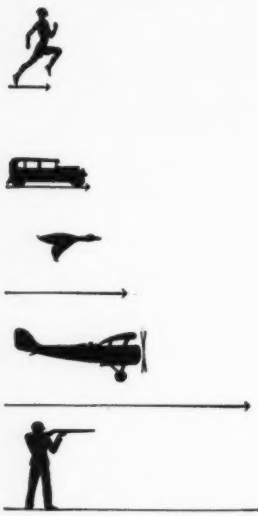


Actual photograph, showing effect of Super-X long range .22 L. R. bullet fired into a block of yellow pine compared with the effect of a harder lead bullet of similar size and velocity. Note how the Super-X bullet expanded as compared with the somewhat deeper penetration but less destructive effect of the harder bullet.

Smaller photo shows the bullets after removal from the block. The special composition of the Super-X bullet made it flatten out, expending all of its energy without excessive penetration.



Greater destructive effect of Super X .22 L. R. bullets compared with harder lead bullets. In the photograph the three holes on the left show the much greater splintering effect of the Super-X bullets as they emerged after passing through three one-inch pine boards.



A FAST SPRINTER covers a distance of 40 yards in 4.09 seconds when running at 20 miles per hour.

A PLEASURE CAR covers 40 yards in 2.05 seconds when traveling at 40 miles per hour.

A DUCK covers 40 yards in 1.363 seconds when traveling at 60 miles per hour.

AN AEROPLANE covers 40 yards in 0.682 seconds when cruising at the rate of 120 miles per hour.

A CHARGE OF BIRDSHOT travels over 40 yards in 0.144 seconds or at the rate of 568 miles per hour.

TIME *and* DESTINATION

WHILE the above drawings show an interesting comparison in speed, they also form a striking example of the limitations imposed by time. The sprinter is not always in form to run his best, nor is it necessary that he equal his best record, as he races against a competitor. The duck does not always fly at the rate shown above, but changes its speed depending upon the danger to which it is exposed. The automobile is capable of far greater speed than that regulated by traffic laws, but the driver must exercise control to obey traffic signals. The aeroplane may attempt to maintain a constant cruising speed but this speed is necessarily varied when it climbs over mountains or descends to a landing field. The shotgun shooter, however, wants his box of shells to be uniform so that each shot load will travel to its target at the same invariable speed.

The automobile driver does not attempt to reach his destination by traveling at a fixed speed. He would have no use for an engine which was not provided with a throttle that would enable him to slow down in traffic and speed up on the open road. He may vary the speed at which he is traveling by as much as 50 per cent and still be sure of arriving at his destination. On the other hand, a charge of shot travels so fast that the shooter is unable to see it in the air, consequently he has to depend blindly upon his experience and the uniformity of the ammunition when leading a flying target. He is not at all interested, therefore, in actual time intervals or the rate of speed of his ammunition. A mathematical analysis will show why the shooter is so dependent upon uniformity.

Assume the target to be a duck cross-flying at 60 miles per hour, 40 yards distant from the shooter. As it takes 0.144 seconds for the shot charge to travel 40 yards, the duck will travel a distance of 12.68 feet in this same time. Therefore, a shooter must aim approximately 12 feet ahead of the duck when he pulls the trigger in order that the shot charge will meet the target. If his shotgun ammunition varies by even a small percentage he would miss the target entirely—shooting behind it with a low velocity cartridge and ahead of it with a high velocity cartridge.

This readily illustrates the need for very accurate control in powder manufacture, in order that the shooter will have at his command an instrument of great precision on which he can depend and benefit by his experience.

The du Pont Company with its experience of 129 years and its present resources can supply to ammunition companies the type and quality of powders required to maintain the reputation of ammunition manufacturers and the confidence of the shooters.

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For information on Target-Shooting, write to National Rifle Association, Barr Bldg., Washington, D. C.; on Trapshooting, to Amateur Trapshooting Association, Vandalia, Ohio; and on Skeet, to National Skeet Association, 108 Massachusetts Avenue, Boston, Mass.

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